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MEMBER OF THE AMERICAN PHILOSOPHICAL SOCIETY, AND OF THE LINNEAN SOCIETY OF PHILADELPHIA;

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MR. NEWTON BOSWORTH,

OF CAMBRIDGE;

ASSISTED BY OTHER GENTLEMEN OF EMINENCE, IN DIFFERENT DEPARTMENTS OF LITERATURE.

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1813.

PANTOLOGIA.

CEANIDES, or CEANTIDES. See ENCHYMONITES.

CEANOTHUS. New Jersey tea. In botany, a genus of the class pentandria, order monogynia. Petals five, saccular, vaulted; berry dry, three-celled, three-seeded. Five species, scattered over Asia, Africa, and America. Of these c. Americanus is chiefly propagated in our own gardens. The stem, which is of a pale brown colour, seldom rises more than three or four feet high, and sends forth branches from the bottom. The flowers are white and terminal, and grow in clusters, giving the shrub a beautiful appearance in their season.

To CEASE. *v. n.* (*cesser*, Fr. *cesso*, Lat.) 1. To leave off; to stop; to give over (*Dryden*). 2. To fail; to be extinct (*Hale*). 3. To be at an end (*Dryden*). 4. To rest (*Sprat*).

To CEASE. *v. a.* To put a stop to; to put an end to (*Milton*).

CEBELL, in music, an ancient English air, the strains of which were alternately in the grave and acute series of notes in the scale.

CEBES, of Thebes, a Socratic philosopher, author of the admired Table of Cebes, or Dialogues on the Birth, Life, and Death of Mankind. He flourished about 405 years before Christ.

CEBRIO. In the Fabrician system of entomology, a tribe of the order coleoptera, and genus cryptocephalus. See CRYPTOCEPHALUS.

CECIL (William), lord Burleigh, a celebrated English statesman, was born of a good family, at Bourn, in Lincolnshire, in 1521, and educated at St. John's college, Cambridge, where he married a sister of sir John Cheke. From Cambridge he went to Gray's Inn, and studied the law with so much application, as to become eminent in that profession. He was appointed master of requests to the protector Somerset; and soon after custus brevium of the court of Common Pleas; and at length secretary of state. He also received the honour of knighthood, and had a seat in the privy-council. When Mary came to the throne, he was dismissed from his employments; but he was still respected, and often consulted by the queen and her ministers. At the accession of Elizabeth, he was appointed one of her counsellors, secretary of state, and master of the court of wards. Soon afterwards he was chosen chancellor of Cambridge; and in 1571 he was advanced to the peerage, with the title of baron of Burleigh. He died in 1598, leaving one son by his first, and one by his second wife; which last lady was the daughter of sir Anthony Cook, aud a very learned woman. Lord Burleigh was perhaps one of the keenest, most active, and yet disinterested ministers that ever lived. He wrote some tracts in answer to libels on the queen and government; and his state papers were published by Haynes in 1740; and a continuation by Murdin in 1760.

CECILIA (Saint), the titular saint and protectress of music. Her history is involved in great obscurity; but she is supposed to have been born in the reign of the emperor Marcus Aurelius Antoninus, and to have suffered martyrdom in that of Septimius Severus, in the beginning of the third century. There is a tradition of St. Cecilia, that she excelled in music; and that the angel who was enamoured of her, was drawn from the celestial regions by the charms of her melody: this has been deemed authority sufficient for making her the patroness of music and musicians. The legend of St. Cecilia has given frequent occasion to painters and sculptors to exercise their genius in representations of her, playing on the organ, and sometimes on the harp. Raphael has painted her singing with a regal in her hands;

and Domenichino and Mignard, singing and playing on the harp. St. Cecilia has likewise served to inflame the genius of poets: Dryden's fine ode on St. Cecilia's day will doubtless be recollected by all our readers.

CECROPIA. In botany, a genus of the class dioecia, order diandria. Male spathe, caducous; ament imbricate, with turbinate, compressed, quadrangular scales. Female, as in the male. Germs imbricate; style one; stigma lacerated; berry one-seeded. A South American tree with hollow trunk and branches: leaves at the ends of the branches, peltate, lobed, white underneath; fruit oblong, cylindrical, compound berries.

CECROPS, a native of Sais in Egypt, who led a colony to Attica about 1556 years before the Christian era, and reigned over part of the country which was called from him Cecropia. He softened and polished the rude and uncultivated manners of the inhabitants, gave them laws and regulations, and introduced among them the worship of those deities which were held in adoration in Egypt. He married the daughter of Actæus a Grecian prince, and was deemed the first founder of Athens. He taught his subjects to cultivate the olive, and instructed them to look upon Minerva as the watchful patroness of their city. After a reign of 50 years, spent in regulating his newly formed kingdom, and in polishing the minds of his subjects, Cecrops died, leaving three daughters. He was succeeded by Cranaus, a native of the country. Some authors have described Cecrops as a monster, half a man and half a serpent; and this fable is explained by the recollection that he was master of two languages, the Greek and Egyptian; or that he had the command over two countries, Egypt and Greece. (*Strab. Herodot.*)

CEDAR, in botany. See JUNIPERUS.

CEDAR OF JAMAICA. See BUBROMA and THEOBROMA.

CEDAR (White). See CUPRESSUS.

CEDAR OF BUSACO. See CUPRESSUS.

CEDAR OF LIBANUS. See PINUS.

CEDRALA. Bastard cedar. In botany, a genus of the class pentandria, order monogynia. Calyx withering; corol five-petalled, funnel-formed, fastened at the base to the receptacle as far as one-third of its length; capsule woody, five-celled, five-valved; seeds imbricate downwards, with a membranaceous wing. A Jamaica tree, with pensile flowers.

CEDRIA, a resinous liquor issuing from the great cedar-tree, or cedar of Lebanon. The word is also written *cedrium*, κεδριον, and *cedrinum*, κεδρινον.

Cedria, when good, yields a strong smell, is transparent, of a thick fatty consistence, so that in pouring it out, it does not fall too fast or freely, but equally drop by drop. It is possessed of two opposite qualities, viz. to preserve dead bodies, by its drying and consuming superfluous moisture without damaging the solid parts; and to putrify the soft and tender parts of living bodies without exciting any pain.

CE'DRINE. *a.* (*cedrinus*, Latin.) Of or belonging to the cedar tree.

CEDRON, or KEDRON, a town of Palestine, on the borders of the Philistines, in the way to Azotus.

CEDRON, or KEDRON, is also the name of a brook or torrent of Palestine, betwixt Jerusalem and mount Olivet on the east side.

CEDROTA, in botany, a genus of the class octandria, order monogynia. Calyx six-parted with the segments concave; corolless; germ surrounded by a gland. One species; a Guiana tree, with opposite lanceolate entire leaves; panicle axillary; small green flowers.

CEFALONIA, or CEPHALONIA, a considerable island of Greece, S. of Albania, belonging to the Venetians. It is very fertile in oil and wine. Its principal town is of the same name. Lat. 38. 22 N. Lon. 20. 36 E.

CEFALU, an episcopal town of the valley of Demona, in Sicily. Lat. 38. 25 N. Lon. 13. 58 E.

CEGINUS, in astronomy, the star λ in Bootes.

To CEIL. *v. a.* (*cœlo*, Latin.) To overlay, or cover, the inner roof of a building (*Chron.*).

CEILING, in architecture, the top or roof of a lower room; or a covering of plaster over laths nailed on the bottom of the joists that bear the upper room; or where there is no upper room, on joists for the purpose; hence called ceiling-joists.

CEILINGS in churches and temples may be considered as the interior coverings of their roofs, as there is nothing between them but the necessary framing by which the whole is supported. For dwelling-houses the simplest and most common sort are those which are flat. These are generally adorned with principal compartments, surrounded with mouldings, either let into the ceiling or projecting from it. Their ornaments and mouldings do not require a bold relief; but being near the eye, they must be finished with neatness and taste.

Coved ceilings are certainly more beautiful than flat ones; but their execution is attended with more expence. They are used promiscuously in large and small rooms, and occupy from one-fifth to one-third of the height of the room. But where the architect is at liberty to proportion the height of the room to its superficial dimensions, the most eligible proportion for the cove is one-fourth of the whole height of the room. The figure of the cove is commonly either a quadrant of a circle or of an ellipsis, taking its rise a little above the cornice, and finishing at the border round the great pannel in the center. The border projects somewhat beyond the coves on the outside; and on the side towards the pannel, it is generally made of sufficient depth to admit the ornaments of an architrave. When the profiles of rooms are gilt, the ceilings ought likewise to be gilt. The usual method is to gild all the ornaments, and leave the ground white, pearl-colour, light blue, or any other that may be proper to set off the gilding to advantage.

CEIMELIA, from κειμαι, to be laid up, in

antiquity, denotes choice or precious pieces of furniture or ornaments, reserved or laid up for extraordinary occasions and uses. The place where these are preserved is called ceimeliarchium; and the keeper of them ceimeliophylax.

CELANDINE. In botany. See CHELIDONIUM.

CELANDINE (Lesser). See RANUNCULUS.

CELANDINE-TREE. See BOCCONIA.

CELA-PRAXITELLIS, the gravers, in astronomy, a new southern constellation. The stars it contains are 0. 0. 0. 1. 2. 13, in all 16, of the first six magnitudes.

CELARENT, in logic, a mode of syllogism, wherein the major and conclusion are universal negative propositions, and the minor an universal affirmative. As

CE No man that is a hypocrite can be saved:
LA Every man who with his lips only cries, Lord, Lord, is a hypocrite:
RENT Therefore, no man, who with his lips only cries Lord, Lord, can be saved.

CELASTRUS. Staff-tree. In botany, a genus of the class pentandria, order monogynia. Corol five-petalled, spreading; capsule three-angled, three-celled; seeds covered with a hood. Thirty-two species scattered over Asia, Africa, and America, but chiefly natives of the Cape. They may be thus subarranged:

A. unarmed: leaves very entire.
B. unarmed: leaves toothed.
C. spinous: leaves very entire.
D. spinous: leaves toothed.

The two most frequently propagated among ourselves are

C. bullatus and c. scandens; both North American plants: the first a shrub of about four feet high with white terminal flowers in spikes: succeeded by a beautiful scarlet fruit. The flowers appear in July. The second a lower shrub with green flowers in June, succeeded by red berries in the autumn.

CE'LATURE. *s.* (*celatura*, Latin.) The art of engraving, or cutting in figures.

CELE (κηλη, from κηλεω, to swell out). In surgery. A tumour caused by the protrusion of a soft part. Hence hydrocele, bubonocele, sarcocele, &c.

CELEBATE. See CELIBACY.

CELEBES, or MACASSAR, an island in the Indian ocean, to the E. of Borneo. It produces no spice but pepper. Opium, however, is found in abundance; and no place is furnished with a greater variety of poisons. In the center of this island are mountains, in which are quarries of stone and marble, and mines of gold, copper, and tin. The natives are Mahometans. The Dutch have strong forts here, by which they keep the natives in awe. Lat. from 1. 30 N. to 5. 30 S. Lon. from 116 to 124 E.

To CE'LEBRATE. *v. a.* (*celebro*, Latin.) 1. To praise; to commend (*Addison*). 2. To distinguish by some rites (*Bacon*). 3. To mention in a set or solemn manner (*Dryden*).

CELEBRA'TION. *s.* (from *celebrate.*) 1. Solemn performance; solemn remembrance (*Sidney. Taylor*). 2. Praise; renown; memorial (*Clarendon*).

CELE'BRIOUS. *a.* (*celeber*, Lat.) Famous; renowned; noted (*Grew*).

CELE'BRIOUSLY. *ad.* In a famous manner.

CELE'BRIOUSNESS. *s.* (from *celebrious.*) Renown; fame.

CELE'BRITY. *s.* (*celebritas*, Lat.) Publick and splendid transaction (*Bacon*).

CELERES, a regiment of guards of the ancient Roman kings, established by Romulus; consisting of three hundred youths, chosen from the families of Rome, and approved by the suffrages of the curiæ of the people, each of which furnished ten. The name comes from *celer*, quick, ready; and was given them, because of their promptness to obey the king.

CELERIAC, in botany. See APIUM.

CELE'RITY. *s.* (*celeritas*, Latin.) Swiftness; speed; velocity (*Hooker. Digby*).

CE'LERY. *s.* A species of *parsley.* See APIUM.

CELE'STIAL. *a.* (*cœlestis*, Latin.) 1. Heavenly; relating to the superior regions (*Shakspeare*). 2. Heavenly; relating to the blessed state (*Shakspeare*). 3. Heavenly, with respect to excellence (*Dryden*).

CELESTIAL-GLOBE. See GLOBE.

CELE'STIAL. *s.* (from the adjective.) An inhabitant of heaven (*Pope*).

CELE'STIALLY. *ad.* In a heavenly manner.

To CELE'STIFY. *v. a.* (from *cœlestis*, Latin.) To give something of heavenly nature to any thing: not used (*Brown*).

CELESTINE. See STRONTIA.

CELESTINS, in church-history, a religious order of Christians, reformed from the Bernardins by pope Celestin V.

The Celestins rise two hours after midnight to say matins: they eat no flesh any time, except when they are sick: they fast every Wednesday and Friday to the feast of the exaltation of the holy cross; and from that feast to Easter, every day.

CELETES, in antiquity, single horses, or those not harnessed together.

CELEUSMA, in antiquity, the shout, or cry, or song, of the mariners, whereby they animated each other in their labours.

CELEUSTES, in ancient navigation, the boatswain, or officer who gave the signals.

CE'LIAC. *a.* (κοιλια, the belly.) Relating to the lower belly (*Arbuthnot*). See COELIAC.

CELIBACY, the state of unmarried persons. Scaliger derives the word from the Greek κοιτη, bed, and λειπω, *linquo*, I leave: others say it is formed from *cœli beatitudo*, the blessedness of heaven. The ancient Romans used all means imaginable to discourage celibacy. Nothing was more usual than for the censors to impose a fine on bachelors. Dionysius Halicarnassensis mentions an ancient constitution whereby all persons of full age were obliged to marry. But the first law of that kind, of which we

have any certainty, is that under Augustus, called *lex Julia de maritandis ordinibus*. It was afterwards denominated *Papia Poppæa*, and more usually *Julia Papia*, in regard of some new sanction and amendments made to it under the consuls Papius and Popæus. By this law, certain prerogatives were given to persons who had many children, and penalties imposed on those who lived a single life, as that they should be incapable of receiving legacies, and not exceeding a certain proportion.

Lord Kames, speaking of this subject in his Sketches, Book i. Sk. 6. says, "I have often been tempted to find fault with Providence in bringing so early to perfection the carnal appetite, while a man, still in early youth, has acquired no degree of prudence nor of self-command. It rages indeed the most when young men should be employed in acquiring knowledge, and in fitting themselves for living comfortably in the world. I have set this thought in various lights; but I now perceive that the censure is without foundation. The early ripeness of this appetite proves it to be the intention of Providence that people should early settle in matrimony. In that state the appetite is abundantly moderate, and gives no obstruction to education. It never becomes unruly, till one, forgetting the matrimonial tie, wanders from object to object. It is *pride and luxury that dictate late marriages*. industry never fails to afford the means of living *comfortably, provided men confine themselves to the demands of nature.*"

CELIBATE, the same with celibacy; but it is chiefly used in speaking of the single life of the popish clergy, or the obligation they are under to abstain from marriage. In this sense we say the law of celibate. Monks and religious take a vow of celibate; and what is more, of chastity. The church of Rome imposes an universal celibacy on all its clergy, from the pope to the lowest deacon and subdeacon. The advocates for this usage pretend that a vow of perpetual celibacy was required in the ancient church as a condition of ordination, even from the earliest apostolic ages. But the contrary is evident from numerous examples of bishops and archbishops, who lived in a state of matrimony, without any prejudice to their ordination or their function. It is generally agreed that most of the apostles were married. Some say all of them, except St. Paul and St. John. Others say St. Paul himself was married, because he writes to his yoke-fellow, whom they interpret his wife. That Peter was married is evident from Matthew viii. 14., Mark i. 29., Luke iv. 38. And the church of England in the matrimonial ceremony, grounds some of its exhortations upon this fact. "Hear also what saint Peter the apostle of Christ, who was himself a married man, saith unto them that are married." Besides, in the first of Paul's epistles to Timothy, a bishop is not only permitted but exhorted to be a married man: "A bishop must be blameless, the husband of one wife:" and hence, in the next ages after the apostles, we have accounts of certain married bishops, presbyters, and deacons, without any reproof or mark of dishonour set on them. The celibacy of the clergy, however, appears of an ancient standing, if not of command and necessity, yet as of counsel and choice. But as it is clearly neither of divine nor apostolical institution, it is at first hard to conceive from what motive the court of Rome persisted so very obstinately to impose this injunction on the clergy. But we are to observe that this was a leading step to the execution of the project formed of making the clergy independent of princes, and rendering them a separate body to be governed by their own laws. In effect, while priests had children, it was very difficult to prevent their dependence on princes, whose favours have such an influence on private men; but having none, they were more at liberty to adhere to the pope.

CELIDOGROPHIA, the description of the spots which appear on the surface of the sun and planets.

CELL. *s.* (*cella*, Latin.) 1. A small cavity or hollow place (*Prior*). 2. The cave or little habitation of a religious person (*Denham*). 3. A small and close apartment in a prison. 4. Any small place or residence (*Prior*). 5. A name given to the small hexagonal divisions in honey-combs. 6. A subordinate kind of monastery.

CELL, (*loculamentum*). In botany, the hollow part of a pericarp, and particularly of a capsule, in which the seeds are lodged. According to the number of these, pericarps are called one-celled, two celled, &c.

CELLA, CELLÆ, from *celare*, to conceal, in ancient writers, 1. A place or apartment usually under ground, and vaulted, in which some sort of necessaries were stored up. 2. The lodge or habitation of a prostitute. 3. Bedrooms of domestics. 4. The apartments of baths. 5. The inmost and most retired parts of heathen temples. Each of these applications of the word is manifestly deducible from its original import.

CELLAR (*cellarium*), in ancient writers, denotes a conservatory of eatables, or drinkables. Cellar differs from vault, as the latter is supposed to be deeper, the former being frequently little below the surface of the ground. —Cellarium also denoted an allowance of bread, wine, or other provision, furnished out of the cella, to the use of the governor of the province and his officers, &c.

CELLARS, in modern building, are the lowest rooms in a house, the ceilings of which usually lie level with the surface of the ground on which the house is built; or they are situated under the pavement before the house, especially in streets and squares. Cellars, and other places vaulted under ground, were called by the Greeks *hypogæa*: the Italians still call them *fundi delle case*.

CELLARER, or CELLERER (*cellerarius*, or *cellarius*), an officer in monasteries, to whom belong the care and procuring provisions for the convent. The denomination is

said to be borrowed from the Roman law, where *cellarius* denotes an examiner of accounts and expences.

CELLARER was also an officer in chapters, to whom belonged the care of temporals.

CELLARIUS (Christopher), a learned man of the 17th century. He was born in 1638 at Smalcalde in Franconia. In 1666 he became D.D. at Jena, and the next year was appointed professor of Hebrew and moral philosophy at Weissenfels, where he remained till 1673, when he became rector of the college at Weimar, which place he quitted three years afterwards for the same office at Zeits. In 1678 he removed to Mersbourg; and in 1693 he accepted the professorship of history at Halle, where he ended his days in 1707. He edited several Latin and Greek authors; but the works by which he is best known are those on ancient history and geography.

CELLEPORA. Cellepore. In zoology, a genus of the class vermes, order zoophytes. Animal a hydra, or polype; coral somewhat membranaceous, composed of round cells. Eight species; chiefly traced in the northern or Mediterranean seas: sometimes brittle and much branched, appearing as if composed of grains of sand; in one or two species resembling a piece of pumice-stone; in several possessing an irregular number of teeth on the mouths; others are white, polished, and pellucid. They are often found on fuci or shells; sometimes on algæ; occasionally covering them as with a crust. The most beautiful species is c. annulata, with oval ventricose annulate cells; the mouths of which are ringent, and about four-toothed; the cells polished and reddish. It inhabits the ocean, and is found on fuci, stones, and lepades.

CELLINI (Benevenuto), a famous sculptor and engraver. He was born at Florence in 1500, and served his apprenticeship to a jeweller and goldsmith. He also learned drawing, engraving, and music; and Clement VII. appointed him both his goldsmith and musician. His courage was equal to his ingenuity; for when Rome was besieged by the duke of Bourbon, the charge of the castle of St. Angelo was committed by the pope to Cellini, who afterwards surrendered it on honourable terms. However, he was of a capricious humour, never contented in one place, and frequently embroiling himself in quarrels. After rambling about from place to plac, he came to Paris, but being disgusted with his salary, he resolved to set out for Jerusalem. The king, however, sent for him, increased his salary, and gave him a house to live in. Still his quarrelsome temper would not suffer him to be at peace; and he went again to his native country, where he died in 1570. His life, written by himself, was translated from the Italian into English in 1771, 2 vols. 8vo. (*Watkins*).

CE'LLULAR. *a.* (*cellula*, Lat.) Consisting of little cells or cavities (*Sharp*).

CELLULAR MEMBRANE. Membrana cellulosa. Tela cellulosa. In anatomy, the cellular structure, composed of laminæ and fibres variously joined together, which is the connecting medium of every part of the body. It is by means of the communication of the cells of this membrane that the butchers blow up their veal. The cellular membrane is by some anatomists distinguished into the reticular and adipose membrane. The former is evidently dispersed throughout the whole body, except the substance of the brain. It makes a bed for the other solids of the body, covers them all, and unites them one to another. The adipose membrane consists of the reticular substance and a particular apparatus for the secretion of oil, and is mostly found immediately under the skin of many parts, and about the kidneys.

CELOSIA. Cock's-comb. In botany, a genus of the class pentandria, order monogynia. Calyx three-leaved; petals five, resembling the leaflets of the calyx; stamens conjoined at the base to the plaited nectary; capsule opening horizontally. Eighteen species; natives of the East or West Indies. Of these c. cristata, or common cock's-comb, is chiefly worth noticing: it is an Asiatic plant, with leaves oblong, ovate; peduncles round, slightly striate: spikes oblong. The colours of the comb, or amaranth, are red, purple, yellow, or white; and sometimes variegated with two or three of these hues. They are tender annuals, propagated by seeds, which should be sown about the beginning of March on a moderate hot-bed. When the plants appear, care should be taken to give them air, and to keep them from moisture. In a fortnight or three weeks time, they will be fit to move to another moderate hot-bed covered with good, rich, light earth, about four inches thick. Raise up the young plants with your finger, so as not to break their roots, and prick them into the new hot-bed about four inches distance every way, giving them a gentle watering to settle the earth to their roots. After this the plants must be screened from the sun till they have taken fresh root, turning the glasses frequently in the day-time, when the weather permits; and if the weather should prove bad, wipe off with a woollen cloth, two or three times a-day, the moisture that arises from the bed, and condenses upon the glass, to prevent its dropping upon the plants. When the plants have taken root, and begin to grow, give them a little air every day; and in about three weeks or a month's time when they will have grown so as to meet, they must have another moderate hot-bed, covered with the same earth about six inches thick, in which they should be planted, with as much earth about their roots as possible, at the distance of seven or eight inches every way, giving them some water as before, and keeping them shaded and aired till they have taken fresh roots. In the beginning of May provide another hot-bed, which should be covered with a deep frame, that the plants may have room to grow. Upon this hot-bed set as many small pots as can stand within the com-

pass of the frame; these pots must be filled with good rich earth, and the cavities between each pot with light common earth. In the beginning of September, when the plants have perfected their seeds, make choice of the largest, least branching, and most beautiful plants of each kind for seed, which you should remove under shelter, that the seeds may be maturely ripened; and in the choice thereof, never take any seed from side branches, nor from the neck of the plume, but such only as are produced in the middle.

CE'LSIA. In botany, a genus of the class didynamia, order angiospermia. Calyx five-parted; corol wheel-shaped; filaments bearded; capsule two-celled. Five species: chiefly natives of the Mediterranean coast.

CELSITANI, a people placed by Ptolemy in the island of Sardinia.

CELSITUDE. *s.* (*celsitudo*, Lat.) Height.

CELSUS (Aurelius Cornelius), a celebrated physician of antiquity. He flourished at Rome in the reign of Tiberius; and wrote eight books on medicine, the best edition of which is that of Leyden, 1730, in 2 vols, 8vo., or Paris, 1772, 12mo. He also wrote treatises on agriculture, rhetoric, and military affairs, which are lost. He is generally allowed to be the best commentator upon Hippocrates.

Celsus, an epicurean philosopher of the second century, who wrote a book against the Christian religion, which was answered by Origen. Celsus, though a most violent opposer of Christianity, mentions so many circumstances in the history of Christ, that an abstract of it might almost be taken from the fragments of his book Λογος αληθη, or, The true Word, preserved by Origen. He never pretends to doubt the real existence of Christ, or the truth of the miraculous facts. Now it cannot be supposed that Celsus would have admitted the miracles of Christ as real facts, had he not been compelled to it by the universal consent of all men in the age in which he lived. So that the question with a candid arguer can never be, whether the miracles be true in fact, but whether the truth of the miracles in the circumstances in which they were performed infer the divine authority of the performer. See Lardner's Works, vol. viii. p. 62. Brucker's History of Philos. by Enfield, vol. ii. p. 141. Mosheim, vol. i. p. 163, &c.

CELTÆ, or Celtes, an ancient nation, by which most of the countries of Europe are thought to have been peopled. The compilers of the Universal History are of opinion that they are descended from Gomer, the eldest son of Japhet, the son of Noah. They think that Gomer settled in the province of Phrygia in Asia; Ashkenaz his eldest son, or Togarmah his youngest, or both, in Armenia, and Riphath the second son in Cappadocia. When they spread themselves wider, they seem to have moved regularly in columns without interfering with or disturbing their neighbours. The descendants of Gomer, or the Celtæ, took the left hand, insensibly spreading themselves westward towards Poland, Hungary, Germany, France, and Spain; while the descendants of Magog, Gomer's brother, moving eastward, peopled Tartary. In this large European track, the Celtes began to appear a powerful nation under a regular monarchy, or rather under several considerable kingdoms. The Celtes went by different names in different parts of the world. With respect to their government we are entirely in the dark.

CELTES, an unmeaning appellation given by antiquarians to certain ancient instruments, probably British battle-axes.

CE'LTIS. The lote or nettle-tree. In botany, a genus of the class polygamia, order monœcia. Hermaph. Calyx five-parted; corolless; stamens five; drupe one-seeded. Male; calyx six-parted; stamens six. Six species: all West Indian or American plants except c. orientalis which is a native of the Levant, with leaves obliquely heart-shaped, serrate, villous underneath. The shrub rises about twelve feet high, and is ornamented with yellow axillary flowers on slender pedicles. C. occidentalis, which is a native of Virginia, is a tree of considerable height and utility. The leaves are of a beautiful bright green, and continue without falling off till very late in the autumn. The trunk is used by coachmakers for their frame-work; and the branches by musical-instrument-makers for flutes, pipes, and similar wind-instruments.

CEMENT, in a general sense, any glutinous substance capable of uniting and keeping things together in close cohesion. In this sense the word cement comprehends mortar, solder, glue, &c. but has been generally restrained to the compositions used for holding together broken glasses, china, and earthenware. For this purpose the juice of garlic is recommended as exceedingly proper, being both very strong, and, if the operation is performed with care, leaving little or no mark. Quicklime and the white of an egg mixed together and expeditiously used, are also very proper for this purpose. Dr. Lewis recommends a mixture of quicklime and cheese in the following manner: "Sweet cheese shaved thin, and stirred with boiling hot water, changes into a tenacious slime, which does not mingle with the water. Worked with fresh parcels of hot water, and then mixed upon a hot stone with a proper quantity of unslaked lime, into the consistence of a paste, it proves a strong and durable cement for wood, stone, earthen-ware, and glass. When thoroughly dry, which will be in two or three days, it is not in the least acted upon by water. Cheese barely beat with quick-lime, as directed by some of the chemists for luting cracked glasses, is not near so efficacious." A composition of the drying oil of linseed and white-lead is also used for the same purposes, but is greatly inferior.

There is a cement for joining glass and china, used in Germany, and which appears to be preferable to that above-mentioned. It is prepared as follows: Take, by measure, two parts of litharge, one of unslaked lime, and one of flint glass; let each be separately reduced to the

finest powder, and worked up into a paste with old drying oil. Hochheimer asserts, that this compound is very durable, and acquires a greater degree of hardness, when immersed in water.

Another composition, which is successfully employed by the Germans, for cementing wood, is prepared from pitch, mixed with bullocks' blood, linseed oil, and turpentine. The whole of these must be put over a fire, in an iron pan, and as much brick-dust added as will make them of the consistence of a thin paste. The tub, or cask, to which this preparation is to be applied, must be perfectly dry before it is laid on; and the chinks or crevices filled up with tow, while the cement is warm. Some melt a due portion of colophony with the other liquids, previously to the adding of the brick-dust; by which means the composition is said to be much improved.

The French chemists have prepared an excellent cement from cheese only, by boiling it in water, stirring it until it is reduced to a glutinous state, and afterwards pouring upon it cold water, kneading, and pounding it.

A strong cement for electrical purposes.—Melt one pound of resin in a pot or pan, over a slow fire; add thereto as much plaister of Paris, in fine powder, as will make it hard enough, which you may soon know by trial; then add a spoonful of linseed-oil, stirring it all the while, and try if it be hard and tough enough for your purpose; if it is not sufficiently hard, add more plaister of Paris; and if not tough enough, a little more linseed oil. This is as good a cement as possible for fixing the necks of globes or cylinders, or any thing else that requires to be strongly fixed; for it is not easily melted again when cold. Or take resin one pound, bees-wax one ounce; add thereto as much red ochre as will make it of sufficient stiffness; pour it into water, and make it into rolls, and it is fit for use. This cement is useful for cementing hoops on glasses, or any other mounting of electrical apparatus.

A cement for glass-grinders.—Take pitch and boil it; add thereto, and keep stirring it all the while, fine sifted wood-ashes, until you have it of a proper temper: a little tallow may be added, as you find necessary. For small work: to four ounces of resin add one-fourth of an ounce of bees-wax melted together; and four ounces of whitening, made previously red hot. The whitening should be put in while hot, that it may not have time to imbibe moisture from the atmosphere.

Shell-lac is a very strong cement for holding metals, glass, or precious stones, while cutting, turning, or grinding them. The metal, &c. should be warmed, to melt it. For fastening ruby cylinders in watches, and similar delicate purposes, shell-lac is excellent.

To solder or cement broken glass.—Broken glass may be soldered or cemented in such a manner as to be as strong as ever, by interposing between the parts, glass ground up like a pigment, but of easier fusion than the pieces to be joined, and then exposing them to such a heat as will fuse the cementing ingredient, and make the pieces agglutinate without being themselves fused. A glass for the purpose of cementing broken pieces of flint glass, may be made by fusing some of the same kind of glass previously reduced to powder, along with a little red lead and borax, or with the borax only.

Cement for Derbyshire spar and other stones.—A cement for this purpose may be made with about seven or eight parts of resin and one of bees-wax, melted together with a small quantity of plaister of Paris. If it be wished to make the cement fill up the place of any small chips that may have been lost, the quantity of plaister must be increased a little. When the ingredients are well mixed, and the whole is nearly cold, the mass should be well kneaded together. The pieces of spar that are to be joined must be heated until they will melt the cement, and then pressed together, some of the cement being previously interposed. Melted sulphur applied to fragments of stones previously heated (by placing them before a fire) to at least the melting point of sulphur, and then joined with the sulphur between, makes a pretty firm and durable joining. Little deficiencies in the stone, as chips out of corners, &c. may also be filled up with melted sulphur, in which some of the powder of the stone has been melted.

Cement, in building, is used to denote any kind of mortar of a stronger kind than ordinary. The cement commonly used is of two kinds; hot, and cold. The hot cement is made of rosin, bees-wax, brick-dust, and chalk boiled together. The bricks to be cemented are heated, and rubbed one upon another, with cement between them. The cold cement is the second above described for cementing china, &c. which is sometimes, though rarely, employed in building.

A peculiar kind of cement is prepared at Madras, with which most of the buildings erected in that Indian capital are cemented. It consists of sand and lime, with the addition only of a small quantity of water, in which a proportion of coarse sugar has been previously dissolved. The quick-setting of this mortar, and the great hardness it acquires, can, as Dr. James Anderson has observed (in his Recreations in Agriculture, vol. i.) only be attributed to one of these two causes, namely, either the sugar added, or the quality of the lime-stone employed at Madras.—There are some kinds of lime-stone in Britain, which afford a much better mortar than others; and this also may be the case in India. Most calcareous earths are blended with sand and other particles, in various proportions; the quality of the mortar or cement will consequently vary, according to the nature of these different ingredients.

It has lately been discovered, that the scrapings of certain roads, consisting chiefly of levigated lime-stone, which is impregnated in a greater or less degree with the dung and urine of animals, form an excellent cement. For ordinary walls, these scrapings alone are fre-

quently used; and, according to the account of Mr. Marshall (in his Rural Economy of Glocestershire), the proportion for the best building is about one part lime to three of those materials, collected from roads composed of lime-stone.

A very good method of making mortar, which is practised by the most skilful of modern masons, is this: Take a quantity of good lime, and having put a sufficient quantity of water in it, leave it to macerate; then the lime which is in a caustic state will dissolve, and what remains undissolved must be sifted out; this done, mix it with an equal portion of large sand well washed, and temper them well together. An ingenious mason made mortar in this way, and having used as much of it as he then wanted, the remainder was put under a shed, where it continued about two years; when the mason found it had become so hard that no tool would penetrate it. Indeed the mortar or cement which is thus formed is converted into a real stone, composed of calcareous or silicious earths, which when completely combined must form a substance, the durability of which would probably continue till time should be no more, unless it were acted upon by some chemical or mechanical agents. This accounts for the strong coherence of the mortar in the ancient Roman and other buildings. Dr. Anderson recommends the use of lime-water, in the above composition, in the room of common water, the fixed air in which has a tendency to spoil the mortar. By mixing together gypsum and quick-lime, and then adding water, we may form a cement of tolerable hardness, and which apparently might be used to advantage in making troughs for holding water, or lining small canals for it to run in. Mr. Wiegleb says, that a good mortar or cement which will not crack, may be obtained by mixing three parts of this magma of slaked lime with one of powdered gypsum; but adds, that it is used only in a dry situation. A mixture of tarras with slaked lime acquires in time a stony hardness, and may be used for preventing water from entering. Dr. Williams's patent mortar consists of 4lb. of the fresh curd of cheese, 12lb. of slaked lime in fine powder, 84lb. of sharp sand, and 10lb. of water. In Mr. Denize's patent cement (dated Nov. 1800) applicable to various purposes, the basis is petroleum or rock oil, in any form; in which a small portion of sulphur is dissolved, by melting; to which is added any kind of vitrescible, earthy matter, such as clinkers, and scoriæ, from iron, or glass furnaces; puzzolane, or any volcanic ashes, &c. These are to be powdered, and stirred into the melted sulphur-oil, till the whole becomes of such a consistence as to be easily spread with a trowel, and does not adhere to the fingers, when cool. This cement is firm, durable, and impervious to moisture.

Those of our readers who may be desirous of additional information, relative to this interesting subject, we refer to the translation of Mr. Loriot's Practical Essay on Cement and artificial Stone, 8vo. 1s. 6d. Cadell, 1774; to a curious paper of Casimis Paymaurin, in Phil. Mag. No. 54. and to Dr. Higgins's Experiments and Observations, made with a View of Improving the Art of composing and applying calcareous Cements, and of preparing Quick-Lime, &c. 8vo. 5s. Cadell, 1780; in which the matter is fully and ingeniously discussed. See also Mortar and Stucco.

Cement, in chemistry, is a name applied to those powdered substances and pastes with which any body is surrounded in pots or crucibles, and which are capable, by the help of fire, of producing changes upon that body. They are made of various materials; and are used for different purposes; thus, iron is covered over with powder of charcoal that it may be converted into steel; glass with plaister or silex to change it into a kind of porcelain; copper, with a mixture of lapis calaminaris and charcoal to form brass; and a compound of gold and silver, with cement royal, for the purpose of separating the silver from the gold when the proportion of the latter is so great as not to be separable by aqua fortis. See Parting.

The process by which all these ends are effected is called cementation, and is very frequently of considerable service for producing changes upon bodies, and forming combinations which could not be easily effected. Those pastes which are used to close the joinings of chemical vessels, &c., are called Lutes, which see.

Cement royal, so called by the ancient chemists because it is used to purify gold, is composed of four parts of bricks powdered and sifted: of one part of green vitriol (sulphat of iron) calcined till it becomes red, and of one part of common salt (muriat of soda). The whole is very accurately mixed together, and a firm paste is made of it by moistening it with a little water or urine.

To Ceme'nt. *v. a.* (from the noun.) To unite by something interposed (*Burnet*).

To Ceme'nt. *v. n.* To come into conjunction; to cohere (*Sharp*).

CEMENTA'TION. *s.* (from *cement.*) The act of cementing.

Cementa'tion, in the arts, a general method of forming steel from iron, by means of the application of charcoal. In a proper furnace layers of bars of malleable iron and layers of charcoal are placed one upon another, the air excluded, the fire is raised to a great height, and kept up for eight or ten days. If after this the conversion of the iron into steel be complete, the fire is extinguished, and the whole is left to cool for six or eight days longer. Iron prepared in this manner is named blistered steel, from the blisters which appear on its surface. Copper is converted into brass by cementation with a powder of calamine and charcoal. The powder thus used is called cement powder.

Cementa'tion, in chemistry, a process in the dry way, similar to digestion in the

moist, by which any substance is exposed to a regular furnace heat in a crucible, stratified or otherwise covered with some kind of powder or cement which is intended to produce a chemical change: See CEMENT, in chemistry, above.

CEME'NTER. *s.* (from *cement.*) A person or thing that unites in society (*Locke*).

CEMETARY. Κοιμητηριόν, (from κοιμάω, I sleep.) A place set apart for the burial of the dead. Anciently none were buried in churches or church-yards; it was even unlawful to bury within cities, and the cemetaries were without the walls.

The practice of consecrating cemetaries is of some antiquity: the bishop walked round in procession, with the crozier, or pastoral staff, in his hand, the holy waterpot being carried before, from which aspersions were made over the ground.

CE'NATORY. *a.* (from *ceno*, Lat.) Relating to supper (*Brown*).

CENCHREA, in ancient geography, a port town of Corinth, situate on the bay of Saron.

CENCHREA was also a name given generally to the isthmus of Corinth, distant 70 furlongs from it, where were celebrated the isthmian games: whence the apostle Paul, in his epistles to the Corinthians, so frequently alludes to these games. See 1 Epist. ix. 2 Epist. iv. 7, 8, 9.

CENCHRUS, in botany, a genus of the class triandria, order monogynia. Involucre jagged, echinated, three or four flowered; calyx two-valved, two-flowered; corol two-valved, awnless; style bifid. Ten species, chiefly natives of the two Indies.

CENEGILD, in the Saxon antiquities, an expiatory mulct paid by one, who killed a man, to the kindred of the deceased.

CENOBI'TICAL. *a.* (κοινος and βιος.) Living in community (*Stillingfleet*).

CENOTAPH, in antiquity, an empty tomb, erected by way of honour to the deceased. It is distinguished from a sepulchre in which a coffin was deposited.

CENSE. *s.* (*census*, Lat.) Publick rate (*Bacon*).

To CENSE. *v. a.* (*encenser*, Fr.) To perfume with odours (*Dryden*).

CENSER, a sacred instrument used in the religious rites of the ancients. The Jewish censer was a small sort of chafing-dish, covered with a dome, and suspended by a chain. It is also used in Romish churches.

CENSIO, in antiquity, the act or office of the censor.

CENSIO-HASTARIA, a punishment inflicted on a Roman soldier, whereby his spear was taken from him, and his wages stopped, and hopes cut off.

CE'NSION. *s.* (*censio*, Lat.) A rate; an assessment (*Hall*).

CENSITUS, a person entered in the censual tables. In the civil law, a servile sort of tenant, who pays capitation to his lord for the land he holds of him.

CENSOR, (from *censere*, to see or perceive,) one of the prime magistrates of ancient Rome. Their business was to register the effects of the Roman citizens, to impose taxes in proportion to what each man possessed, and to take cognizance or inspection of the manners of the citizens. In consequence of this last part of their office, they had a power to censure vice or immorality, by inflicting some public mark of ignominy on the offender. They had even a power to create the princeps senatus, and to expel from the senate such as they deemed unworthy of that office. This power they sometimes exercised without sufficient grounds; and therefore a law was at length passed, that no senator should be degraded or disgraced in any manner, until he had been formally accused and found guilty by both the censors. It was also a part of the censorian jurisdiction to fill up the vacancies in the senate, upon any remarkable deficiency in their number; to let out to farm all the lands, revenues, and customs of the republic; and to contract with artificers for the charge of building and repairing all the public works and edifices both in Rome and the colonies of Italy. In all parts of their office, however, they were subject to the jurisdiction of the people; and an appeal always lay from the sentence of the censors to that of an assembly of the people.

The republic of Venice still has a censor of the manners of their people, whose office lasts six months.

CENSORS OF BOOKS, are a body of doctors or others, established in some countries where the government is arbitrary, to examine all books before they go to the press, and to see they contain nothing contrary to the interests of the monarch. At Paris, the faculty of theology claimed this privilege as granted to them by the pope; but, in 1624, new commissions of four doctors were created, by letters-patent, the sole censors of all books, and answerable for every thing contained in them. Even in England, we had formerly an officer of this kind, under the title of licenser of the press: but, since the revolution, our press has been laid under no such dangerous restraint.

CENSO'RIAL, something that relates to the office of censor.

CENSO'RIAN. *a.* (from *censor.*) Relating to the censor (*Bacon*).

CENSO'RIOUS. *a.* (from *censor.*) Addicted to censure; severe (*Sprat*).

CENSO'RIOUSLY. *ad.* In a severe reflecting manner.

CENSO'RIOUSNESS. *s.* (from *censorious.*) Disposition to reproach (*Tillotson*).

CE'NSORSHIP. *s.* (from *censor.*) 1. The office of a censor. 2. The time in which the office of censor is born (*Brown*).

CENSUAL BOOKS, those wherein the census was taken down.

CE'NSURABLE. *a.* (from *censure.*) Worthy of censure; blameable (*Locke*).

CE'NSURABLENESS. *s.* Blamableness.

CE'NSURE. *s.* (*censura*, Latin.) 1. Blame; reprimand; reproach (*Pope*). 2. Judgment; opinion (*Shak.*). 3. Judicial sentence (*Shak.*). 4. Spiritual punishment (*Hammond*).

To CE′NSURE. *v. a.* (*censurer*, French.) 1. To blame; to brand publickly (*Saunderson*). 2. To condemn by a judicial sentence.

CE′NSURER, *s.* He that blames (*Addison*).

CENSUS, among the Romans, was an authentic declaration made by the several subjects of the empire, of their respective names, and places of abode, before proper magistrates, in the city of Rome, called censors; and in the provinces censitors, by whom the same were registered. This declaration was accompanied with a catalogue, or enumeration, in writing, of all the estates, lands, and inheritances, they possessed; their quantity, quality, place, wives, children, tenants, domestics, slaves, &c.

The census was held, as is commonly thought, every five years; but Dr. Middleton has shewn, that both the census and lustrum were for the most part held irregularly and uncertainly, at very different and various intervals of time. See LUSTRUM.

The census was an excellent expedient for discovering the strength of the state: by it they learnt the number of the citizens, how many were fit for war, or for offices of other kinds; and how much each was able to pay of taxes towards the charge of the war.

Hence, also, census came to signify a person who had made such a declaration: in which sense it was opposed to incensus, a person who had not given in his estate, or name, to be registered.

CENSUS likewise denoted a man's whole substance or estate. Thus census senatorius denoted the patrimony of a senator: census equester, the patrimony of a knight.

CENSUS, again, denoted a man of the first class. Also a tax, otherwise called capitation. It is often united with other words to denote different kinds of taxes or tributes.

CENT, in commerce, an abridgment of centum, is used to express the profit or loss arising from the sale of any commodity. Thus we say, there is 10 per cent. profit, or 10 per cent. loss; which is $\frac{1}{10}$ profit, or $\frac{1}{10}$ loss, upon the sale of the whole.

CENTAUR. See CENTAURI.

CENTAUREA, knapweed. In botany, a genus of the class syngenesia, order polygamia frustranea. Receptacle bristly; down simple; florets of the ray funnel-form, irregular, longer than those of the disk, or else none. A hundred and twenty-one species, scattered over Europe, Asia, and Africa; of which several are indigenous to the hedges and cornfields of our own country. This extensive family may be subdivided as follows:

A. Plants with calyx smooth unarmed: denominated jacea.

B. Scales of the calyx setaceous-ciliate: denominated cyanoides.

C. Calyx scales ciliate-serrati: denominated cyanus.

D. Calyx scales dry, scarious ciliate serrate.

E. Calyx scales dry scarious, entire, or jagged.

F. Calyx-scales with a tuft of spines, or a palmeta spine at top: denominated stoebe.

G. Calyx with compound spines; denominated caliatrapa.

H. Calyx-ciliate, ending in a spine.

I. Spines of calyx-scales simple.

Beyond this we have only space to notice that c. cyanus with its upper leaves linear sessile very entire, lower ones lanceolate, toothed, is the common blue-bottle of our cornfields; and that c. calcitrapa, with calyx double spined, sessile; leaves pinnatifid, linear, toothed; stem much spread, hairy, is the calcitrapa of the dispensatories, and is found wild in our own wastes and commons.

CENTAUREA BEHEN. See BEHEN.

CENTAUREA BENEDICTA. See CARDUUS BENEDICTUS.

CENTAUREA CALCITRAPA. See CALCITRAPA.

CENTAUREA CYANUS. The systematic name of the plant which affords the flores cyani. See CYANUS.

CENTAURI, in fabulous history, a people of Thessaly, half men and half horses. The most generally received account is, that they were the offspring of Centaurus, son of Apollo, by Stilbia, daughter of the Peneus. According to some, the Centaurs were the fruit of Ixion's adventure with the cloud in the shape of Juno. This fable of the existence of the Centaurs, arises from the ancient people of Thessaly having tamed horses, and having appeared to their neighbours mounted on them. Some derive the name απο του κεντειν ταυρους, goading bulls, because they went on horseback after their bulls which had strayed, or because they hunted wild bulls with horses. The battle of the Centaurs with the Lapithæ is famous in history. Ovid, Hesiod, Val. Flaccus, have all described it, and the famous painters Phidias and Parrhasius represented it in the temple of Jupiter at Olympia and at Athens. The origin of this battle was a quarrel at the marriage of Hippodamia with Pirithous, where the Centaurs, intoxicated with wine, behaved with rudeness, and even offered violence to the women that were present. Such an insult irritated Hercules, Theseus, and the rest of the Lapithæ, who defended the women, wounded and defeated the Centaurs, and obliged them to leave their country, and retire to Arcadia. They were almost all afterwards extirpated by Hercules, and few escaped the common destruction. *Diod. Hesiod. Homer*, &c.

CENTAURIUM MINUS, (*centaurium*, from κενταυρος, a centaur). Lesser or common centaury. Gentiana centaurium of Linnéus and Hudson. Gentiana corollis quinquifidis infundibuliformibus, caule dichotomo, pistilli simplici, and chironia centaurium of Withering and Curtis. This plant is justly esteemed to be the most efficacious bitter of all the medicinal plants indigenous to this country. It has been recommended by Cullen as a substitute for gentian, and by several is thought to be a more useful medicine. The tops of the centaury plant are directed for use by the colleges of London and Edinburgh, and are most commonly given in infusion; but they may

also be taken in powder, or be prepared into an extract. See CHIRONIA CENTAUREUM.

CENTAURUS, in astronomy, a moiety of an old southern constellation. See LUPUS. The stars it contains are 1. 4. 5. 14. 8. 0, in all 32, of the first six magnitudes.

CENTAURY. See CHIRONIA.

CENTENARIUS, in antiquity, an officer who had the government of a village, or the command of an 100 men.

CE'NTENARY. *s.* (*centenarius*, Lat.) The number of a hundred (*Hakewill*).

CENTER, in geometry, &c. See CENTRE.

CENTER, CENTRE, or CENTERING, (from the French *ceintre* or *cintre*) a name given to the frame of timber, by which the brick or stone of arched vaulting is supported during its erection, and from which it receives its form and curvature.

In easy situations, where the arches are of small extent, and where sufficient foundation can be had in every part of it for supporting the frame, the number of the props which we can set up dispenses with much care; and a frame of very slight timbers connected together in the ordinary way, will suffice for carrying the weight, and for keeping the arch in exact shape. But, when the arches have a wide span, and consequently a very great weight, and when intermediate pillars cannot be set up, either for want of a foundation in the soft bottom of a river, or because the arch is turned between two lofty piers, as in the dome of a stately cathedral—we are then obliged to rest every thing on the piers themselves; and the framing which is to support our arch before the key stone is set, must itself be an arch, depending on the mutual abutment of its beams. This view of the construction of a centre, it is natural to think, would offer itself at first; but it has not been so. When intermediate pillars were not employed, it was usual to frame the mould for the arch with little attention to any thing but its shape, and then to cross it and recross it in all directions with other pieces of timber, till it was thought so bound together that it could be lifted in any position, and when loaded with any weight could not change its shape. The frame was then raised in a lump, like any solid body of the same shape, and set in its place. This is the way still practised by many, who, having no clear principles to guide them, do not stop till they have made a load of timber almost equal to the weight which it is to carry. But this artless method, besides leading the employer into great expence, is frequently fatal to the undertaker, from the unskilfulness of the construction.

The principles from which we are to derive the proper disposition are the general mechanical principles of CARPENTRY, of which we have given some account in that article. These furnish one general rule: when we would give the utmost strength possible to a frame of carpentry, every piece should be so disposed that it is subject to no strain but what either pushes, or draws it in the direction of its length: and, if we would be indebted to timber alone for the force or strength of the centre, we must rest all on the first of these strains: for when the straining force tends to *draw* a beam out of its place, it must be held there by a mortise and tenon, which possesses but a very trifling force, or by iron straps and bolts. Cases occur where it may be very difficult to make every strain a thrust, and the best artists admit of ties; and, indeed, where we can admit a tie-beam connecting the two feet of our frame, we need seek no better security. But this may sometimes be very inconvenient. When it is the arch of a bridge that we are to support, such a tie-beam would totally stop the passage of small craft up and down the river. It would often be in the water, and thus exposed to the most fatal accidents by freshes, &c. Interrupted ties, therefore, must be employed, whose joint or meetings must be supported by something analogous to the king-posts of roofs. When this is judiciously done, the security is abundantly good. But great judgment is necessary, and a very scrupulous attention to the disposition of the pieces. It is by no means an easy matter to discern whether a beam, which makes a part of our centre, is in a state of compression or in a state of extension. In some works of the most eminent carpenters even of this day, we see pieces considered as struts (and considerable dependence had on them in this capacity), while they are certainly performing the office of tie-beams, and should be secured accordingly. This was the case in the boldest centre (we think) that has been executed in Europe, that of the bridge of Orleans, by Mr. Hupeau. Yet it is evidently of great consequence not to be mistaken in this point; for when we are mistaken, and the piece is stretched which we imagine to be compressed, we not only are deprived of some support that we expected, but the expected support has become an additional load.

To ascertain this point, we may suppose the piers to yield a little to the pressure of the arch-stones on the centre frames. The feet, therefore, fly outwards, and the shape is altered by the sinking of the crown. We must draw our frame anew for this new state of things, and must notice what pieces must be made longer than before. All such pieces have been acting the part of tie-beams.

But a centre has still another office to sustain; it must keep the arch in its form; that is, while the load on the centre is continually increasing, as the masons lay on more courses of arch-stones, the frame must not yield and go out of shape, sinking under the weight on the haunches, and rising in the crown, which is not yet carrying any load. The frame must not be supple; and must derive its stiffness, not from the closeness and strength of its joints, which are quite insignificant when set in competition with such immense strains, but from struts or ties, properly disposed, which hinder any of the angles from changing its amplitude.

It is obvious, from all that has been said, that the strength and stiffness of the whole must be found in the triangles into which this frame of carpentry may be resolved. We have seen that the strains which one piece produce on two others, with which it meets in one point, depends on the angles of their intersection; and that it is greater as an obtuse angle is more obtuse, or an acute angle more acute. And this suggests to us the general maxim, "to avoid as much as possible all very obtuse angles." Acute angles which are not necessarily accompanied by obtuse ones, are not so hurtful; because the strain here can never exceed the straining force; whereas, in the case of an obtuse angle, it may surpass it in any degree.

What we shall describe under the name of a *center* is, properly speaking, only one frame, truss, or rib, of a center. Several of these are set up in

vertical planes, parallel to each other, at the distance of 5, 6, 7, or 8 feet, like the trusses, or main couples of a roof; and bridging joists laid across them. In smaller works these are laid sparingly, but of considerable scantling, and are boarded over; but for great arches, a bridging joist is laid for every course of arch-stones, with blockings between, to keep them at their proper distances. The stones are not laid immediately on these joists, but beams of soft wood are laid along each joist, on which the stone is laid. These beams are afterwards cut out with the chisel, in order to separate the centre from the ring of stones, which must now support each other by their mutual abutment.

The centre is distinguishable into two parts ALLB (fig. 7. Pl. 25.), and LDL, which are pretty independent of each other, or at least act separately. The horizontal STRETCHER LL cuts the semicircle ADB half way between the spring and the crown of the arch; the arches AL and LD being 45° each. This stretcher is divided in the same proportion in the points G and H; that is GH is one half of LL, and LG, HL are each one fourth of LL nearly. Each end is supported by two STRUTS EI, GI, which rest below on a sole or BED properly supported. The interval between the heads of the struts GI, HK is filled up by the STRAINING BEAM GH, abutting in a proper manner on the struts. (See CARPENTRY). The extremities L, L, are united in like manner by butting joints, with the heads of the outer struts. The ARCH MOULDS AP, BP, are connected with the struts by cross pieces PQ, which we shall call BRIDLES, which come inwards on each side of the struts (being double), and are bolted to them. This may be called the lower part of the frame. The upper part consists of the king-post DR, supported on each side by the two struts or braces ML, ON, mortised into the post, and also mortised into the stretcher at the points L, N, where it is supported by the struts below. The arches LD, LD are connected with the struts by the bridles PQ, in the same manner as below.

There is a great propriety in many parts of this arrangement. The lower parts or haunches of the arch press very lightly on the centres. Each archstone is lying on an inclined plane, and tends to slide down only with its relative weight; that is, its weight is to its tendency to slide down the joint as radius to the sine of elevation of the joint. Now it is only by this tendency to slide down the joint that they press on the centering, which in every part of the arch is perpendicular to the joint: but the pressure on the joint, arising from this cause, is much less than this, by reason of the friction of the joints. A block of dry freestone will not slide down at all; and, therefore, will not press on the centering, if the joint be not elevated 35 degrees at least. But the archstones are not laid in this manner, by sliding them down along the joint, but are laid on the centres, and slide down *their* slope, till they touch the blocks on which they are to rest; so that, in laying the archstones, we are by no means allowed to make the great deduction from their weight just now mentioned, and which Mr. Couplet prescribes (Mem. Acad. Sciences, 1729). But there is another cause which diminishes the pressure on the centres; each block slides down the planks on which it is laid, and presses on the block below it, in the direction of the tangent to the arch. This pressure is transmitted through this block, in the same direction, to the next, and through it to the third, &c. In this manner it is plain that, as the arch advances, there is a tangential pressure on the lower archstones, which diminishes their pressure on the frame, and, if sufficiently great, might even push them away from it. Mr. Couplet has given an analysis of this pressure, and shews, that in a semicircular arch of uniform thickness, none of the archstones below 30° press on the frames. But he, without saying so, calculates on the supposition that the blocks descend along the circumference of this frame in the same manner as if it were perfectly smooth. As this is far from being the case, and as the obstructions are to the last degree various and irregular, it is quite useless to institute any calculation on the subject. A little reflection will convince the reader, that in this case the obstruction arising from friction *must* be taken into account, and that it *must not* be taken into account in estimating the pressure of each successive course of stones as they are laid. It is enough that we see that the pressure of the lower courses of archstones on the frame is diminished. Mr. Couplet says, that the whole pressure of a semicircular arch is but $\frac{4}{5}$ths of its weight; but it is much greater for the reason just now given. From a combination of circumstances which it would be tedious to relate, we believe that the centres carry, at least, $\frac{2}{3}$ds of the weight of the arch before the keystone is set. In elliptical and lower pitched circular arches, the proportion is still greater.

It seems reasonable enough, therefore, in disposing the framing, to direct the main support to the upper mass of the arch which presses most on the frame. We shall also derive another advantage from this construction. The struts which carry the king-post spring from those points of the stretcher where it rests on the struts below: thus the stretcher, on which all depends, bears no transverse strains. It is stretched by the strut above it, and it is compressed in a small degree between the struts below it, at least by the outer ones. Mr. Pitot proposes the straining beam GH as a lateral support to the stretcher, which may, therefore, be of two pieces: but although it augments the strength it does not seem necessary. The stretcher is abundantly carried by the strap, which should suspend it from the king-post. The great use of the straining piece is to give a firm abutment to the inner struts, without allowing any lateral strain on the stretcher.

This centre gives a very distinct view of the offices of all the parts. It is the simplest that can be in its principle, because all the essential parts are subjected to one kind of strain. The stretcher LL is the only exception, and its extension is rather a collateral circumstance than a step in the general support. Precisely the same mode of construction may be adopted for the centre of an elliptical arch: but it would be unjust to recommend the method generally without pointing out its defects. We must observe, then, that the lateral strains which are brought upon the upper struts by the bridles, certainly transmit to them part of the weight of the archstones on the curves. The space between the curves and ML might advantageously be trussed. But the causing the middle bridle to reach down to the stretcher seems to secure the upper struts from all risk of bending. It has another very palpable defect. If the piers should yield to the load, and the feet of the centre fly out, the lower part will exert a very considerable strain on the stretcher, tending to break it

across between N and L, and on the other side. HEK of the lower part is firmly bound together, and cannot change its shape, and will, therefore, act like a lever, turning round the point F. It will draw the strut HK away from its abutment with GH, and the stretcher will be strained across at the place, between H and F, where it is bolted with the bridle. This may be resisted in some degree by an iron strap uniting ON and HK; but there will still be a want of proportional strength. Indeed, in a semicircular arch there is but little risk of this yielding of the piers; still, however, what we have alluded to is an imperfection.

After having given this account of the more simple construction of centres, we might proceed to describe several of such as have a much greater complication of principle: but as a minute description of various modes of centering would occupy more room than can be properly appropriated to this article, we must content ourselves with giving an account of the centering used by Mr. Mylne at Blackfriars bridge, which together with the remarks interspersed will, we hope, be useful and satisfactory. The span of the middle arch is 100 feet (see ARCH), and its height from the spring is about 43. The drawing fig. 8. Pl. 25. is sufficiently minute to convey a distinct notion of the whole. We need not be very particular in our observations, after what has been said on the general principles of construction. The leading maxim, in the present example, seems to be, *that every part of the arch shall be supported by a simple truss of two legs resting, one on each pier.* H, H, &c. are called APRON PIECES to strengthen the exterior joints, and to make the RING as stiff in itself as possible. From the ends of this apron-piece proceed the two legs of each truss. These legs are 12 inches square: they are not of an entire piece, but of several, meeting in firm abutment. Some of their meetings are secured by the double king-posts, which grasp them firmly between them, and are held together by bolts. At other intersections, the beams appear halved into each other; a practice which cannot but weaken them much, and would endanger their breaking by cross strains, if it were possible for the frame to change its shape. But the great breadth of this frame is an effectual stop to any such change. The fact was, that *no sinking or twisting whatever* was observed during the progress of the mason work. Three points in a straight line were marked on purpose for this observation, and were observed every day. The arch was more than six feet thick; and yet the sinking of the crown, before setting the key-stones, did not amount to one inch. The simple truss, reaching from pier to pier for the middle point of the arch, gives the strong support where it is most of all wanted; and in the lateral points H, although one leg of the truss is very oblique, the other compensates for it by its upright position.

The chief peculiarity of this centre is to be seen in its base. This demands a more particular attention: but we must first make some observations on the condition of an arch, as it rests on the centering after the keystones are all set, and on the gradual transference of the pressure from the boards of the centering to the joints of the archstones.

While all the archstones lie on the centering, the lower courses are also leaning pretty strongly on each other. But the mortar is hardly compressed in the joints; and least of all in the joints near the crown. Suppose the arch to be Catenarean, or of any other shape that is perfectly equilibrated. When the centering is gradually withdrawn, all the archstones follow it. Their wedge-like form makes this impossible, without the middle ones squeezing the lateral ones aside. This compresses the mortar between them. As the stones thus come nearer to each other, those near the crown must descend more than those near the haunches, before every stone has lessened its distances from the next by the same quantity; for example, by the hundredth part of an inch. This circumstance alone must cause a sinking in the crown, and a change of shape. But the joints near the crown are *already* more open than those near the haunches. This produces a still greater change of form before all is settled. Some masons endeavour to remedy, or at least to diminish, this, by using no mortar in the joints near the crown. They lay the stones dry, and even force them together by wedges and blocks laid between the stones on opposite sides of the crown: they afterwards pour in fine cement. This appears a good practice. Perronet rejects it, because the wedging sometimes breaks the stones. We should not think this any great harm; because the fracture will make them close where they would otherwise lie hollow. But, after all our care, there is still a sinking of the crown of the arch. By gradually withdrawing the centering, the joints close, the archstones begin to butt on each other, and to force aside the lateral courses. This abutment gradually increasing, the pressure on the haunches of the centering is gradually diminished by the mutual abutment, and ceases entirely in that course, which is the lowest that formerly pressed it: it then ceases in the course above, and then in the third, and so on. And, in this manner, not only the centering quits the arch, gradually, from the bottom to the top, *by its own retiring from it*, but the arch partly quits the centering *by changing its shape.* If the centering were now pushed up again, it would touch the arch first at the crown; and it must *lift up* that part gradually before it come again in contact with the haunches. It is evident, therefore, that an arch, built on a centre of a shape perfectly suited to equilibration, will not be in equilibrio when the centering is removed. It is therefore necessary to form the centering in such a manner (by raising the crown) that it shall *leave* the arch of a proper form. This is a very delicate task, requiring a previous knowledge of the ensuing change of form. This cannot be ascertained by the help of any theory we are acquainted with.

But, suppose this attained, there is another difficulty: while the work advances, the centering is warped by the load laid on it, and continually increasing on each side. The first pressure on the centering forces down the haunches, and raises the crown. The arch is, therefore, less curved at the haunches than is intended: the joints, however, accommodate themselves to this form, and are close, and filled with mortar. When the masons approach the middle of the arch, the frame sinks there, and rises up at the haunches. This opens all the joints in that place on the *upper* side. By the time that the keystones are set, this warping has gone farther; and joints are opened on the *under* side near the crown. It is true we are here speaking rather of an extreme case, when the centering is *very* flexible: but this occurred to Mr. Perronet in the two great bridges of Neuilly and

of Mantz. In this last one, the crown sunk above a foot before the key was set, and the joints at the haunches opened above an inch *above*, while some nearer the crown opened near a quarter of an inch *below*.

In this condition of things, it is a delicate business to strike the centering. Were it removed in an instant, all would probably come down; for the archstones are not yet abutting on each other, and the joints in the middle are open below. Mr. Perronet's method appears to us to be very judicious. He began to detach the centering at the very bottom, on each side equally, where the pressure on the centering is very slight. He cut away the blocks which were immediately under each archstone. He proceeded gradually upwards in this way with some speed, till all was detached that had been put out of shape by the bending of the centering. This being no longer supported, sunk inward, till it was stopped by the abutment which it found on the archstones near the crown, which were still resting on their blocks. During part of this process, the open joints opened still more, and looked alarming. This was owing to the removal of the load from the haunches of the centering. This allowed the crown to sink still more, by forcing out the archstones at the haunches. He now paused some days; and during this time the two haunches, now hanging in the air, gradually pressed in toward the centering, their outer joints closing in the mean while. The haunches were now pressing pretty hard on the archstones nearer the crown. He then proceeded more slowly, destroying the blocks and bridgings of these upper archstones: and thus by a series of cautious and slow gradations, the whole removal was at length effected.

Mr. Perronet mentions another mode of striking the centering, which he says is very usual in France. Every second bridging is cut out: some time after, every second of the remainder; after this, every second of the remainder; and so on, till all are removed. This, we are glad to say, is never practised in this country, for it is certainly a very bad method. It leaves the arch hanging by a number of distant points; and it is astonishing that any arch can bear the treatment.

Our architects have generally proceeded with extreme caution. Wherever they could, they supported the centering by intermediate pillars, even when it was trussed and had a tie-beam reaching from side to side. The centre was made to rest, not immediately on these pillars, but on pieces of timber formed like acute wedges, placed in pairs, one above the other, and having the point of the one on the thick end of the other: in order to make these wedges slippery they were well soaped and rubbed with black lead. When the centres are to be struck men are stationed at each pair of the wedges with heavy mauls, with directions to strike *together* on the opposite wedges. By this operation the whole centering descends together; or, when any part of the arch is observed to have opened its joints on the upper side, the wedges below that part are slackened.. The framing may perhaps bend a little, and allow that part to subside. If any part of the arch is observed to open its joints on the under side, the wedges below that part are allowed to stand after the rest have been slackened. By this process the whole comes down gradually, and as slowly as we please, and the defects of every part of the arch may be attended to. Indeed the caution and moderation of our builders have usually been such, that few defects have been allowed to shew themselves.

These observations on the management of the internal movements of a great arch, will enable the reader to appreciate all the merit of Mr. Mylne's ingenious construction: we proceed, therefore, to complete our description.

The gradual enlargement of the base of the piers of Blackfriars bridge enabled the architect to place a series of five posts *c*, *c*, *c*, *c*, *c*, one on each step of the pier; the ingenious contexture of which made it like one solid block of stone. (See ARCH.) These struts were gradually more and more oblique, till the outer one formed an obtuse angle with the lowest side of the interior polygon of the truss. On the top of these posts was laid a sloping SEAT or beam D of stout oak, the upper part of which was formed like a zig-zag scarfing. The posts were not perpendicular to the under side of the seat. The angles next the pier were somewhat obtuse. Short pieces of wood were placed between the heads of the posts (but not mortised into them), to prevent them from slipping back. Each face of the scarf was covered with a thick and smooth plate of copper. The feet of the truss were mortised into a similar piece F, which may be called the SOLE of the truss, having its lower side notched in the same manner with the upper side of D, and, like it, covered with copper. Between these two lay the STRIKING WEDGE E, the faces of which correspond exactly with the slant faces of the seat and the sole. The wedge was so placed, that the corresponding faces touched each other for about half of their length. A block of wood was put in at the broad end or base of this wedge, to keep it from slipping back during the laying the archstones. Its outer end E was bound with iron, and had an iron bolt several inches long driven into it. The head of this bolt was broad enough to cover the whole wood of the wedge within the iron ferrule.

We presume that the reader, by this time, foresees the use of this wedge. It is to be driven in between the sole and the seat (having first taken out the block at the base of the wedge). As it advances into the wider spaces, the whole truss must descend, and be freed from the arch; but it will require prodigious blows to drive it back. Mr. Mylne did not think so, founding his expectation on what he saw in the launching of great ships, which slide very easily on a slope of 10 or 12 degrees. He rather feared, that taking out the block behind would allow the wedge to be pushed back at once, so that the descent of the truss would be too rapid. However, to be certain of the operation, he had prepared an abundant force in a very ingenious manner. A heavy beam of oak, armed at the end with iron, was suspended from two points of the centre like a battering ram, to be used in the same way. Nothing could be more simple in its structure, more powerful in its operation, or more easy in its management. Accordingly the success was to his wish. The wedge did not slip back of itself; and very moderate blows of the ram drove it back with the greatest ease. The whole operation was over in a very few minutes. The spectators had suspected, that the space allowed for the recess of the wedge was not sufficient for the settlement of the arch; but the architect trusted to the precautions he had taken in its construction. The reader, by turning to the article ARCH, will see, that there was only the arch LY, fig. 1. Pl. 14. which could be expect-

ed to settle: accordingly, the recess of the wedge was found to be much more than was necessary. However, had this not been the case, it was only necessary to take out the pieces between the posts below the seat, and then to drive back the heads of the struts; but this was not needed (we believe) in any of the arches. We are well assured that none of the arches sunk an inch and a half. The great arch of 100 feet span did not sink one inch at the crown. It could hardly be perceived whether the arch quitted the centering gradually or not, so small had been the changes of shape.

We have no hesitation in saying, that (if we except some waste of great timber by uncommon joggling) the whole of this performance is the most perfect of any that has come to our knowledge. We doubt not but that a due consideration of it will be highly instructive to the enquiring architect, and, therefore, confidently recommend it to his notice.

Those who have a desire to pursue this entertaining as well as interesting subject, are referred to the excellent article CENTRE in the supplement to the Encyclo. Britan. whence the major part of the present article was extracted.

CENTERING OF AN OPTIC GLASS, the grinding it so as that the thickest part is exactly in the middle.

One of the greatest difficulties in grinding large optic glasses is, that in figures so little convex, the least difference will put the center two or three inches out of the middle. Dr. Hook notes, that though it were better the thickest part of a long object glass were exactly in the middle, yet it may be a very good one when it is an inch or two out of it. Phil. Trans. No. 4. p. 57. Id. ibid. p. 64, seq.

CENTESIMA USURA, in antiquity, usury where the money is lent out at one per cent per month.

CENTESIMATION, a milder kind of military punishment, in cases of desertion, &c. when only each hundredth man suffered.

CENTESM, or CENTESIMAL, the hundredth part of any thing.

CENTIFO'LIOUS. *a.* (from *centum* and *folium*, Latin.) Having a hundred leaves.

CENTILOQUIUM, a collection of 100 sentences, opinions, or sayings. Thus we read of the centiloquium of Hermes, of Ptolemy, &c.

CENTINEL, or CENTRY, in military language, is a private soldier, from the guard posted upon any spot of ground, to stand and watch carefully for the security of the said guard, or of any body of troops, or posts, and to prevent any surprise from the enemy. All centinels are to be very vigilant on their posts; neither are they to sing, smoke, or suffer any noise to be made near them. They are not to sit down, lay their arms out of their hands, or sleep; but keep moving about their posts during the two hours they stand, if the weather will allow of it. No centry to move more than 50 paces to the right, and as many to the left of his post; and let the weather be ever so bad, he must not get under any other cover than that of the centry-box. No one to be allowed to go from his post without leave from his commanding officer; and, to prevent desertion or marauding, the centries and vedettes must be charged to let no soldiers pass.

CENTIPES, CENTIPEDES. See SCOLOPENDRA.

CENTNER, among metallurgists and assayers, denotes a weight divisible first into a hundred, and afterwards into other lesser parts. It is, however, to be observed, that the centner of metallurgists is the same with the common hundredweight; whereas that of assayers is no more than one dram, to which the other parts are proportional, and nevertheless pass by the names 100lb. 64lb. 32lb. &c.

CENTO, (*cento*, Latin, a patch-work, or garment composed of different pieces in different colours.) In poetry, a work wholly composed of verses or passages promiscuously taken from other authors, only disposed in a new form and order. Proba Falconia has written the life of Jesus Christ in centos taken from Virgil. Alexander Ross has done the like in his Christados, and Stephen de Pleure the same.

CENTONARII, in antiquity, certain of the Roman army, who provided different sorts of stuff called centones, made use of to quench the fire which the enemy's engines threw into the camp.

CE'NTRAL. *a.* (from *centre.*) Relating to the centre; placed in the centre (*Woodward*).

CENTRAL ECLIPSE, is when the centres of the luminaries exactly coincide, and come in a line with the eye.

CENTRAL FORCES, are forces having a tendency directly towards or from some point or centre; or forces which cause a moving body to tend towards, or recede from, the centre of motion. And accordingly they are divided into two kinds, in respect to their different relations to the centre, and hence are called centripetal, and centrifugal.

The doctrine of central forces makes a considerable branch of the Newtonian philosophy, and has been greatly cultivated by mathematicians, on account of its extensive use in the theory of gravity, and other physico-mathematical sciences.

In this doctrine, it is supposed that matter is equally indifferent to motion or rest; or that a body at rest never moves itself, and that a body in motion never of itself changes either the velocity or the direction of its motion; but that every motion would continue uniformly, and its direction rectilinear, unless some external force or resistance should affect it, or act upon it. Hence, when a body at rest always tends to move, or when the velocity of any rectilinear motion is continually accelerated or retarded, or when the direction of a motion is continually changed, and a curve line is thereby described, it is supposed that these circumstances proceed from the influence of some power that acts incessantly; which power may be measured, in the first case, by the pressure of the quiescent body against the obstacle which prevents it from moving, or by the velocity gained or lost in the second case, or by the flexure of the curve described in the third case: due regard being had to the time in which these effects are produced, and other circumstances, according to the principles of mechanics. Now the power or force of gravity produces effects of each of these kinds,

which fall under our constant observation near the surface of the earth; for the same power which renders bodies heavy, while they are at rest, accelerates their motion when they descend perpendicularly; and bends the track of the motion into a curve line, when they are projected in a direction oblique to that of their gravity. But we can judge of the forces or powers that act on the celestial bodies by effects of the last kind only. And hence it is, that the doctrine of central forces is of so much use in the theory of the planetary motions.

Sir I. Newton has treated of central forces in lib. 1. sec. 2. of his Principia, and has demonstrated this fundamental theorem of central forces, viz. that the areas which revolving bodies describe by radii drawn to an immoveable centre, lie in the same immoveable planes, and are proportional to the times in which they are described. Prop. 1.

Laws of Central Forces.—1. The following is a very clear and comprehensive rule, for which we are obliged to the marquis de l'Hôpital: Suppose a body of any determinate weight to revolve uniformly about a centre, with any given velocity; find from what height it must have fallen, by the force of gravity, to acquire that velocity; then, as the radius of the circle it describes is to double that height, so is its weight to its centrifugal force. So that, if b be the body, or its weight or quantity of matter, v its velocity, and r the radius of the circle described, also $\frac{1}{2}g = 16\frac{1}{12}$ feet; then, first $g^2 : v^2 : : g : \frac{v^2}{g}$ the height due to the velocity v; and as

$r : \frac{v^2}{g} : : b : \frac{v^2 b}{gr} = f$ the centrifugal force. And hence, if the centrifugal force be equal to the gravity, the velocity is equal to that acquired by falling through half the radius.

2. The central force of a body moving in the periphery of a circle, is as the versed sine AM of the indefinitely small arc AE; or it is as the square of that arc AE directly, and as the diameter AB inversely. For AM is the space through which the body is drawn from the tangent in the given time, and 2AM is the proper measure of the central force. But, AE being very small, and therefore nearly equal to its chord, by the nature of the circle

$AB : AE : : AE : AM = \frac{AE^2}{AB}$. Fig. 1. Pl. 38.

3. If two bodies revolve uniformly in different circles; their central forces are in the duplicate ratio of their velocities directly, and the diameters or radii of the circles inversely;

that is $F : f : : \frac{V^2}{D} : \frac{v^2}{d} : : \frac{V^2}{R} : \frac{v^2}{r}$

For the force, by the last article, is as $\frac{AE^2}{AB}$ or $\frac{AE^2}{D}$; and the velocity v is as the space AE uniformly described.

4. And hence, if the radii or diameters be reciprocally in the duplicate ratio of the velocities, the central forces will be reciprocally in the duplicate ratio of the radii, or directly as the 4th power of the velocities; that is, if $V^2 : v^2 : : r : R$, then $F : f : : r^2 : R^2 : : V^4 : v^4$.

5. The central forces are as the diameters of the circles directly, and squares of the periodic times inversely. For if c be the circumference described in the time t, with the velocity v; then the space $c = tv$, or $v = \frac{c}{t}$; hence, using this value of v in the 3d rule, it becomes $F : f : : \frac{C^2}{DT^2} : \frac{c^2}{dt^2} : : \frac{D}{T^2} : \frac{d}{t^2} : : \frac{R}{T^2} : \frac{r}{t^2}$; since the diameter is as the circumference.

6. If two bodies, revolving in different circles, be acted on by the same central force; the periodic times are in the subduplicate ratio of the diameters or radii of the circles; for when $F = f$, then $\frac{D}{T^2} = \frac{d}{t^2}$, and $D : d : : T^2 : t^2$, or $T : t : \sqrt{D} : \sqrt{d} : : \sqrt{R} : \sqrt{r}$.

7. If the velocities be reciprocally as the distances from the centre, the central forces will be reciprocally as the cubes of the same distances, or directly as the cubes of the velocities. That is, if $V : v : : r : R$, then is $F : f : : r^3\ R^3 : : V^3 : v^3$.

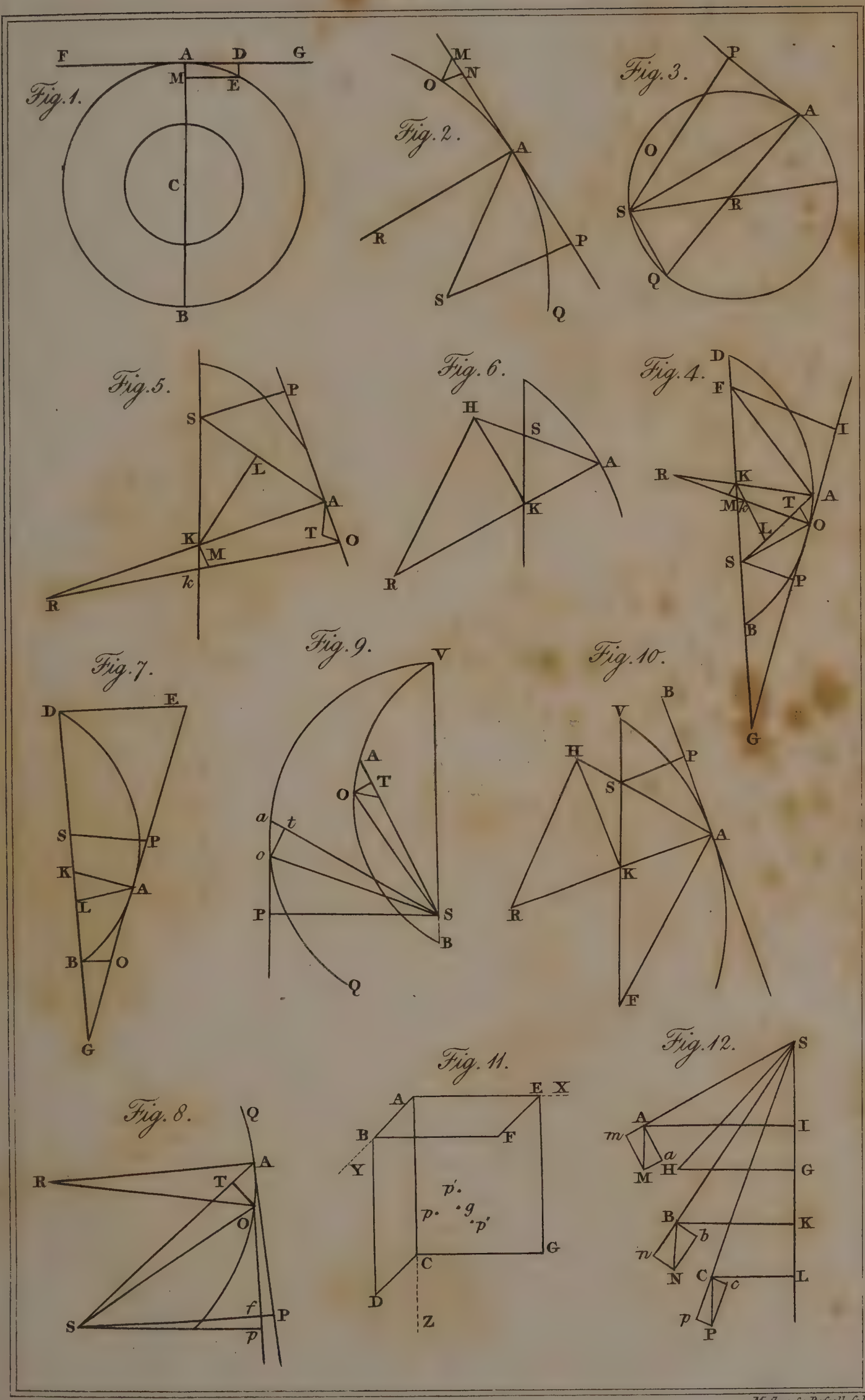
8. If the velocities be reciprocally in the subduplicate ratio of the central distances, the squares of the times will be as the cubes of the distances: for if $V^2 : v^2 : : r : R$, then is $T^2 : t^2 : : R^3 : r^3$.

9. Wherefore, if the forces be reciprocally as the squares of the central distances, the squares of the periodic times will be as the cubes of the distances; or when $F : f : : r^2 : R^2$, then is $T^2 : t^2 : : R^3 : r^3$.

The general doctrine of central forces is called most into application in the investigation of the orbits of the planets attracted towards the sun as a central body: and considered in that view, the following deduction of the principal laws will often be of much service.

Theorem. If a body, urged by a centripetal force, move in any curve; then, in every point of the curve, that force will be in a ratio, compounded of the direct ratio of the body's distance from the centre of force, and the reciprocal ratio of the cube of the perpendicular on the tangent to the same point of the curve, drawn into the radius of curvature of the same point.

Demonstr. Let QAO, fig. 2, Pl. 38 be any curve, described by a moving body, urged by a centripetal force tending to the point S. And let AO be an arc described in any very small time, PM its tangent, AR the radius of the circle of equal curvature, that is, of which the element of the periphery coincides with the arc AO. And let SP be a perpendicular on the tangent; also draw OM and ON parallel to SA and SP. Let OM express the force by which the body at A is urged towards S: then the force by which the body recedes perpendicularly from the tangent, will be as ON; that is, the force tending towards R, and causing the body, moving with the same velocity as before, to describe a circle equicurved with the arc AO, will be to the force tending towards S, by which the body moves in the curve AO, as ON to OM, or, by equiangular triangles, as SP to SA. But the centripetal forces of bodies, moving in circles, are as the squares of the velocities applied to the radii, and the velocity is reciprocally as SP; therefore the force ON, or the force by which the body can move in an equicurved circle, will be as $\frac{1}{SP^2 \times AR}$: but it has been shown that SP is to SA, as the force tending towards R, by which the body can move in an equicurved circle, is to the force tending towards S; and the force tending towards R is as



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$\frac{1}{SP^2 \times AR}$; therefore as $SP : SA :: \frac{1}{SP^2 \times AR} : \frac{SA}{SP^3 \times AR}$, which therefore is as the force tending towards S. Q. E. D.

Corol. If the curve QAO be a circle, the centripetal force tending towards S, will be as $\frac{SA}{SP^3}$, fig. 3, Pl. 38. Therefore if the centripetal force tend towards S, a point situated in the circumference, then, by Eucl. 32, iii. the angle PAS = the angle at AQS; therefore by the similar triangles ASP, ASQ, it will be $AQ : AS :: AS : SP$; therefore $SP = \frac{AS^2}{AQ}$, and $SP^3 = \frac{AS^6}{AQ^3}$; hence $\frac{SA}{SP^3} = \frac{SA \times AQ^3}{AS^6} = \frac{AQ^3}{AS^5}$; that is, because AQ is given, the force will be reciprocally as AS^5.

Let DAB (fig. 4.) be an ellipsis, whose axis is DB, its foci F and S, also AR and OR two perpendiculars to the curve very near together: draw KL and OT perpendiculars on SA, and KM perpendicular to OR. Then because $SA : SK ::$ (by Eucl. 3, vi.) $FA + SA : FS$, that is in a given ratio, the fluxions of SA, SK, that is AT, Kk, will be proportional to SA, SK: also, by conic sections, AL = half the latus rectum $= \frac{1}{2}L$: further, because KA is parallel to SP, the angle ASP = KAL = TOA, because TAO is the complement of each to a right angle; therefore $KA : AL :: SA : SP$, hence $SP = \frac{L}{2} \times \frac{SA}{KA}$, and $KA = \frac{L \times SA}{2SP}$.

Again, since by the equiangular triangles KMk, GPS and OTA, SPA,

it is $KM : Kk :: GP : GS :: AP : SK$
also $Kk : AT :: \ldots\ldots\ldots\ldots SK : SA$
and $AT : AO :: \ldots\ldots\ldots\ldots AP : SA$,

it will be $KM : AO :: AP^2 : SA^2 :: SA^2 - SP^2 : SA^2 :: SA^2 - \frac{L^2 \times SA^2}{4AK^2} : SA^2 :: 4AK^2 - L^2 : 4AK^2$; hence $L^2 : 4AK^2 :: (AO - KM : AO ::) AK : AR$, and therefore $AR = \frac{4AK^3}{L^2}$. In like manner $\frac{4AK^3}{L^2} = \frac{L \times SA^3}{2SP^3}$ is found equal to the radius of curvature in the hyperbola.

But in the parabola the calculation will be easier. For, because of the subnormal being given, it is always $Kk = AT$ the fluxion of the axis, fig. 5; and the equiangular triangles KkM, ATO, SPA, AKL, hence $KM : Kk :: AP : SA$; also AT or $Kk : AO :: AP : SA$; hence $KM : AO :: AP^2 : SA^2 :: SA^2 - SP^2 : SA^2$; hence it will be $SP^2 : SA^2 :: AO - KM : AO :: AK : AR$, and therefore $AR = \frac{SA^2 \times AK}{SP^2}$: but AL = half the latus rectum $= \frac{1}{2}L$, and $AK : AL :: SA : SP$; therefore $SP = \frac{L \times SA}{2AK}$, and $SP^2 = \frac{L^2 \times SA^2}{4AK^2}$; therefore $AR = \frac{4AK^3}{L^2} = \frac{L \times SA^3}{2SP^3}$, because $AK = \frac{L \times SA}{2SP}$.

And hence arises a very easy construction, for determining the radius of curvature in any conic section. For let AK be perpendicular to the section, meeting the axis in K, fig. 6, erect KH perpendicular to AK, meeting AS produced in H; erect HR perpendicular to AH; then will AR be the radius of curvature. In the parobala the construction becomes a little simpler. For since, by the nature of the parabola, it is SA = SK, and AKH is a right angle, S will be the centre of a circle passing through A, K, H; whence the radius of curvature is found by producing SA to H, till SH = SA, and erecting the perpendicular HR: then R will be the centre of the circle osculating the parabola at A.

The centripetal force tending to the focus of the conic section, in which the body moves, is reciprocally proportional to the square of the distance. For since $AR = \frac{L \times SA^3}{2SP^3}$, it will be $\frac{SA}{SP^2 \times AR} = \frac{SA \times 2SP^3}{SP^3 \times L \times SA^3} = \frac{2}{L \times SA^2}$; that is $\frac{1}{SA^2}$ is as the centripetal force, because L is a given quantity.

Let BAD, fig. 7, be an ellipsis, to which GE is a tangent at A; and to which tangent AK and PS are perpendicular, and S the centre. Then $SP \times KA$ will be equal to a 4th part of the figure of the axis, or = the square of the less semiaxis = $BO \times DE$. For because of the equiangular triangles, GBO, GLA, GAK, GPS, GDE, it will be,

$SP : SG \quad :: \quad BO : GO$
$SG : GD :: BG : LG :: GO : GA$
$DG : DE \quad :: \quad GA : AK$,

hence $SP : DE :: BO : AK$ and $SP \times AK = DE \times BO = \frac{1}{4}L \times SB$.

Hence, if a body move in an ellipsis, with a centripetal force tending to its centre, that force will be directly as the distance.

For it is $\frac{SP^3 \times 4AK^3}{L^2}$ = a given quantity, because $SP \times AK$ is given. Therefore the force, as $\frac{SA}{SP^3 \times AR}$, will be as the distance SA.

In fig. 4, from the other focus F drawing FI perpendicular to the tangent; then by the equiangular triangles SAP, FAI, it will be $SA : SP :: FA : FI = \frac{SP \times FA}{SA}$; hence it will be $SP \times FI = \frac{SP^2 \times FA}{SA}$ = the square of the less semi-axis. So that, if the greater axis be called b, and the less $2d$, it will be

$SP^2 = \frac{d^2 \times SA}{b - SA}$ and $SP = d\sqrt{\frac{SA}{b - SA}}$.

But in the hyperbola it is $SP = d\sqrt{\frac{SA}{b + SA}}$.

And in the parabola it is $SP = \sqrt{d \times SA}$, putting $4d$ for its latus rectum.

Because $TA^2 : TO^2 :: AP^2 : SP^2 :: SA^2 - SP^2 : SP^2 :: SA^2 - \frac{d^2 SA}{b - SA} : \frac{d^2 SA}{b - SA} :: SA - \frac{d^2}{b - SA} : \frac{d^2}{b - SA} :: bSA - SA^2 - d^2 : d^2$, it will be $\sqrt{(bSA - SA^2 - d^2)} : d :: TA : TO$; and since $TA = SA$, it will be $TO = \frac{dSA}{\sqrt{(bSA - SA^2 - d^2)}}$.

Now let QAO, fig. 8, be any curve, the element of the arc being AO, to which AP and Op are tangents, also AR the radius of curvature, and SP, Sp perpendiculars to the tangents: then will $AR = \frac{SA \times TA}{fP}$. For, by similar triangles, it is $fP : AO :: PA : RA$,

and $AO : TA :: SA : PA$; hence ex æquo it will be $fP : TA$ or $SA :: SA : RA$; but $fP = SP$, therefore it will be $RA = \frac{SA \times SA}{SP}$.

Hence if the distance SA be drawn into its fluxion, and divided by the fluxion of the perpendicular, it will give the radius of curvature. By which theorem the curvature is easily determined in radial curves or spirals. For example, let AQ be the nautical spiral; then because the angle SAP is given, the ratio of SA to SP will be also given: let that ratio be a to b; then will $SP = \frac{bSA}{a}$, and $\dot{SP} = \frac{b\dot{SA}}{a}$, and $AR = \frac{SA \times \dot{SA}}{\dot{SP}} = \frac{aSA}{b}$. Hence it plainly appears, that the evolute of the nautical spiral, is the same spiral in another position.

Because $AR = \frac{SA \times \dot{SA}}{\dot{SP}}$ it will be $\frac{SA}{SP^3 \times AR} = \frac{\dot{SP}}{SP^3 \times \dot{SA}}$. And hence again, from the given relation of SA to SP, the law of the centripetal force will be easily found.

Example.—Let VAB, fig. 9, be an ellipsis, whose focus is S, the greater axis $VB = b$, the less axis $= 2d$, and latus rectum $= 2r$. And let VaQ be another curve, so related to this, that the angle VSA may be always proportional to the angle VSa; and let Sa = SA. Then it is required to assign the law of the centripetal force tending to S, by which the body may move in the curve VaQ.

Because the angle VSA is to VSa in a given ratio, the increments of these angles will be in the same ratio, which let be the ratio of m to n: hence it will be $ot = \frac{n}{m}OT$. But $OT = \frac{d\dot{SA}}{\sqrt{(bSA - SA^2 - d^2)}}$; hence $ot = \frac{nd\dot{SA}}{m\sqrt{(bSA - SA^2 - d^2)}}$. And because $\dot{SA}^2 + \dot{SP}^2 : \dot{SP}^2 :: ta^2 + ot^2 : ot^2 :: \dot{SA}^2 + \frac{n^2d^2\dot{SA}^2}{m^2(bSA - SA^2 - d^2)} : \frac{n^2d^2\dot{SA}^2}{m^2(bSA - SA^2 - d^2)} :: \dot{SA}^2 + \frac{n^2d^2}{m^2(bSA - SA^2 - d^2)} : \frac{n^2d^2}{m^2(bSA - SA^2 - d^2)} :: m^2(bSA - SA^2 - d^2) + n^2d^2 : n^2d^2$;

hence $\sqrt{m^2(bSA - SA^2 - d^2) + n^2d^2} : nd :: \dot{SA} : \dot{SP} = \frac{nd\dot{SA}}{\sqrt{m^2(bSA - SA^2 - d^2 + n^2d^2}}$. To find the fluxion of this, put x for $m^2(bSA - SA^2 - d^2) + n^2d^2$; then will $\dot{SP} = \frac{nd\dot{SA}}{\sqrt{x}}$, and $\dot{SP}^3 = \frac{n^3d^3\dot{SA}^3}{x\sqrt{x}}$: hence $\dot{x} = m^2b\dot{SA} - 2m^2SA.\dot{SA}$, and $\dot{SP} = nd\dot{SA}x^{-\frac{1}{2}} - \frac{1}{2}nAS\dot{x}x^{-\frac{3}{2}} = \frac{2nd\dot{SA}x - nd\dot{SA}\dot{x}}{2x^{\frac{3}{2}}}$ by reducing to the same denominator. And substituting the values of x and $\dot{x}$, and reducing to order, it will be $\dot{SP} = nd\dot{SA} \times \frac{m^2bSA - 2m^2d^2 + 2n^2d^2}{2x^{\frac{3}{2}}}$; hence it will be $\frac{\dot{SP}}{SP^3.\dot{SA}} = \frac{\frac{1}{2}m^2bSA - m^2d^2 + n^2d^2}{n^2d^2SA^3}$. But the former of these being as the centripetal force, therefore the latter is so too: or, because n^2d^2 in the denominator is a given quantity, that force will be as $\frac{\frac{1}{2}m^2bSA - m^2d^2 + n^2d^2}{SA^3}$: or, putting $\frac{1}{2}br$ for d^2, and omitting the given quantity $\frac{1}{2}b$, the force is as $\frac{m^2SA - rm^2 + rn^2}{SA^3} = \frac{m^2}{SA^2} + \frac{rn^2 - rm^2}{SA^3}$. All which exactly coincides with what is delivered by Newton, on the centripetal force of a body moved in the same curve, in pr. 44 of the Principia.

Because the centripetal force tending to the point S, by which the body can move in a curve, is always as $\frac{\dot{SP}}{SP^3.\dot{SA}}$; hence, from the law of the centripetal force being given, the relation between SA and SP may be found; and therefore, by the inverse method of tangents, the curve may be exhibited, which shall be described by a given centripetal force.

For instance, let the force be reciprocally as any power m of the distance, that is, let $\frac{\dot{SP}}{SP^3.\dot{SA}} = \frac{b}{a^2SA^m}$, it will be $\frac{\dot{SP}}{SP^3} = \frac{b\dot{SA}}{a^2SA^m}$; then the fluents give $\frac{1}{2}SP^{-2} = \frac{bSA^{1-m} \mp e}{m - 1.a^2}$, and hence $\frac{m - 1.\frac{1}{2}a^2}{bSA^{1-m} \mp e} = SP^2$; and here multiplying the numerator and denominator by SA^{m-1}, and putting d^2 for $m - \frac{1}{2}a^2$, it becomes $\frac{d^2SA^{m-1}}{b \mp eSA^{m-1}} = SP^2$; therefore $SP = d\sqrt{\frac{SA^{m-1}}{b \mp eSA^{m-1}}}$ or $= d\sqrt{\frac{SA^{m-1}}{b}}$ only, when e is equal to nothing.

Thus, if the force be reciprocally as the square of the distance; it may be either $SP = d\sqrt{\frac{SA}{b}}$, or $d\sqrt{\frac{SA}{b - SA}}$, or $d\sqrt{\frac{SA}{b + SA}}$; the curve, in the first case, being the parabola whose latus rectum is $\frac{4d^2}{4}$, in the second case it is an ellipsis, and in the third an hyperbola.

If the force be reciprocally as the cube of the distance, it may be either $SP = \frac{dSA}{b}$ or $= \frac{dSA}{\sqrt{b - eSA}}$, or $= \frac{dSA}{\sqrt{b + eSA}}$; in the first case the curve being the nautical spiral; in the second case the curve is the same as that which Newton has constructed by the sector of an hyperbola; and the third case the same as he constructed by elliptic sectors, in cor. 3, pr. 1, lib. 1, Principia.

If the centripetal force be reciprocally as the distance, the relation between SA and SP cannot be defined by any algebraic equation; yet the curve may be constructed by the logarithmic line, or by the quadrature of the hyperbola; for it is then $SP = \frac{d}{\sqrt{b - \text{log.of } SA}}$.

Let now a body move in the curve QAO, fig. 2, by means of a centripetal force tending to S; and let the velocity of the body at A be called C; also the velocity with which a body, urged by the same force, at the same distance, can move in a circle, be called c. It appears from the first theorem, that if SA express the centripetal force tending to S; then the centripetal force tending to R, by means of which the body, with the velocity C, may describe a circle whose radius is AR, will be expressed by SP. But the centripetal forces of

bodies describing circles, are as the squares of the velocities applied to the radii of the circles. Therefore it will be, SP : SA :: $\frac{C^2}{AR} : \frac{c^2}{SA}$; hence $SP.AR : SA^2 :: C^2 : c^2$, and $C : c :: \sqrt{SP.AR} : SA$.

If SP coincide with SA, as is the case in the vertices of the figures, it will be $C : c :: \sqrt{AR} : SA$. So that if the curve be a conic section, AR the radius of curvature at its vertex, is equal to half the latus rectum, or $\frac{1}{2}L$; and therefore the velocity of the body in the vertex of the section, will be to the velocity of the body describing a circle at the same distance, in the subduplicate ratio of the latus rectum to the double distance.

Since $AR = \frac{SA.S\dot{A}}{S\dot{P}}$, then $C^2 : c^2 :: \frac{SP.SA.S\dot{A}}{S\dot{P}} : SA^2 :: \frac{SP.S\dot{A}}{S\dot{P}} : SA :: SP.S\dot{A} : SA.S\dot{P}$. Therefore, from the given relation of SP to SA, the ratio of C to c will be given. For example, if the force be reciprocally as the m power of the distance, that is, if $\frac{S\dot{P}}{SP^3.S\dot{A}} = \frac{b}{a^2SA^m}$; then $S\dot{P} = \frac{bSP^3S\dot{A}}{a^2SA^m}$; therefore $C^2 : c^2 :: SP.S\dot{A} : \frac{bSP^3.SA.S\dot{A}}{a^2SA^m} :: a^2SA^{m-1} : bSP^3$. Whence if we put $SP^2 = \frac{d^2SA^{m-1}}{b} = \frac{m-1.a^2SA^{m-1}}{2b}$, it will be $C^2 : c^2 :: a^2SA^{m-1} : m-1.\frac{1}{2}a^2SA^{m-1} :: m-1 : 2$; and therefore $C : c :: \sqrt{2} : \sqrt{m-1}$.

But if $SP^2 = \frac{d^2SA^{m-1}}{b-eSA^{m-1}} = \frac{m-1.\frac{1}{2}a^2SA^{m-1}}{b-eSA^{m-1}}$, then $C : c :: a^2SA^{m-1} : \frac{m-1.\frac{1}{2}a^2bSA^{m-1}}{b-eSA^{m-1}}$ that is, as $b-eSA^{m-1}$ to $m-1.\frac{1}{2}b$. But the ratio of $b-eSA^{m-1}$ to $m-1.\frac{1}{2}b$, is less than the ratio of b to $m-1.\frac{1}{2}b$, or than the ratio of 2 to $m-1$; hence C will be to c, in a less ratio than $\sqrt{2}$ to $\sqrt{m-1}$.

In like manner, if there be taken $SP = \frac{d^2SA^{m-1}}{b+eSA^{m-1}}$, it will be found that C will be to c, in a greater ratio than that of $\sqrt{2}$ to $\sqrt{m-1}$.

Corol.—If a body move in a parabola, and the centripetal force tend to the focus S; then the velocity of the body, will be to the velocity of a body describing a circle at the same distance, every where as $\sqrt{2}$ to 1: for in that case it is $m=2$, and $m-1=1$. But the velocity of a body in an ellipsis, is to the velocity of a body moving in a circle at the same distance, in a less ratio than that of $\sqrt{2}$ to 1. And the velocity in an hyperbola is to the velocity in a circle, in a greater ratio than that of $\sqrt{2}$ to 1.—If the body move in the nautical spiral, its velocity is every where equal to the velocity of a body describing a circle at the same distance: for in this case it is $m=3$, and $m-1=2$.

PROBLEM.—Supposing that the centripetal force (the absolute quantity of which is known) is reciprocally as the square of the distance, and a body is projected in a given direction, with a given velocity; to find the curve in which the body will move.

Let the body be projected in the right line AB, fig. 10, with the given velocity C. And since the absolute quantity of the centripetal force is known, there will thence be given the velocity with which a body can describe a circle at the distance SA, by the same force: for it is equal to that acquired by a body in falling through $\frac{1}{2}$SA, while urged constantly by the same force. Let that velocity be c. Erect AK perpendicular to AB, in which take AR a fourth proportional to c^2, C^2, $\frac{SA^2}{SP}$; then AR will be the radius of curvature at A. Draw RH perpendicular to AS, and HK perpendicular to AR; then drawing SK, it will give the position of the axis. Make the angle FAK equal to the angle SAK. Then if FA be parallel to SK, the figure in which the body moves will be a parabola. But if it meet the axis SK in F; and if the points S and F fall on the same side of the point K, the figure will be an hyperbola; but if S and F fall on contrary sides, the figure will be an ellipsis. Hence, with the foci S, F, and the axis $=$ SA $\pm$ FA, the section may be described, in which the body will move.

Those who wish to investigate more profoundly the laws of central forces, may consult Varignon in Memoirs of French Academy, 1700, 1701, Maclaurin's Fluxions, Simpson's Fluxions, Gregory's Mechanics, vol. i. Dawson's Essay on the Inverse Problem of Central Forces in the Manchester Memoirs, or in Leybourn's Mathematical Repository, Nos. 4, and 5, New Series, and Waring's curious paper on Centripetal Forces, Phil. Transac. vol. lxxviii. or New Abridgment, part 63.

CENTRAL RULE, a rule invented by Mr. Thomas Baker (author of the Geometrical Key), for determining the centre of a circle which shall cut a given parabola, in as many points as an equation to be constructed has real roots. The central rule is founded on this property of the parabola, that if a line be inscribed in that curve perpendicular to any diameter, the rectangle of the segments of such line is equal to the rectangle of the intercepted part of the diameter and the parameter of the axis. The principal use of this rule is in the construction of equations, and it has been applied successfully as far as biquadratics.

CE'NTRALLY. *ad.* With regard to the centre.

CE'NTRE. *s.* (*centrum*, Latin.) The middle; that which is equally distant from all extremities. Or, it is a point so situated that some certain effects are equal on all sides of it.

CENTRE OF ATTTRACTION OR GRAVITATION, is the point to which bodies tend by gravity; or that point to which a revolving body is impelled or attracted, by the force of gravity.

CENTRE OF A BASTION, a point in the middle of the gorge. Or, it is the point where the two adjacent curtains produced intersect each other.

CENTRE OF A CIRCLE, is the point in the circle from which all lines drawn to the circumference are equal.

CENTRE OF A CONIC SECTION, is the middle point of any diameter, or the point in which all the diameters intersect and bisect one another.

CENTRE OF A CURVE OF THE HIGHER KIND, is the point where two diameters meet.

CENTRE OF A DIAL, is that point where its gnomon or stile, which is placed parallel to

the axis of the earth, intersects the plane of the dial; and from thence, in those dials which have centres, all the hour-lines are drawn.

CENTRE OF FRICTION, is that point in the base of a body on which it revolves, into which if the whole surface of the base, and the mass of the body were collected, and made to revolve about the centre of the base of the given body, the angular velocity destroyed by its friction would be equal to the angular velocity destroyed in the given body by its friction in the same time.

CENTRE OF GRAVITY of any body or system of bodies is that point about which the body or system, acted upon only by the force of gravity, will balance itself in all positions: or it is a point which when supported, the body or system will be supported, however it may be situated in other respects.

The centre of gravity of a body is not always within the body itself: thus the centre of gravity of a ring is not in the substance of the ring, but in the axis of its circumscribing cylinder: and the centre of gravity of a hollow staff, or of a bone, is not in the matter of which it is constituted, but somewhere in its imaginary axis. Every body, however, has a centre of gravity, and so has every system of bodies.

By the definition of the centre of gravity, when it is supported the body is in equilibrio; and from the nature of equilibrium it can only be produced singly by the exercise of a force equal and opposite to the resultant of all the other forces acting upon the several particles of the body, that is, since in this case the forces are parallel, by a force equal to the weight of the body applied at the centre of parallel forces: consequently the centre of gravity coincides with the centre of parallel forces.

Varying the position of the body will not cause any change in the centre of gravity; since any such mutation will be nothing more than changing the directions of the forces, without their ceasing to be parallel; and if the forces do not continue the same, in consequence of the body being supposed at different distances from the earth, still the forces upon all the moleculæ vary proportionally, and their centre remains unchanged.

When a heavy body is suspended by any other point than its centre of gravity, it will not rest unless that centre is in the same vertical line with the point of suspension: for in all other positions the force which is intended to ensure the equilibrium, will not be directly opposite to the resultant of the parallel forces of gravity upon the several particles of the body, and of course the equilibrium will not be obtained.

If a heavy body be sustained by two or more forces, their directions must meet either at the centre of gravity of that body, or in the vertical line which passes through it.

When a body stands upon a plane, if a vertical line passing through the centre of gravity fall within the base on which the body stands, it will not fall over; but if that vertical line passes without the base, the body will fall, unless it be prevented by a prop or a cord. When the vertical line falls upon the extremity of the base, the body may stand, but the equilibrium may be disturbed by a very trifling force; and the nearer this line passes to any edge of the base the more easily the body be thrown over; the nearer it falls to the middle of the base, the more firmly the body stands.

To find the centre of gravity mechanically, it is only requisite to dispose the body successively in two positions of equilibrium, by the aid of two forces in vertical directions, applied in succession to two different points of the body; the point of intersection of these two directions will shew the centre required.

This may be exemplified by particularising a few methods. If the body have plane sides, as a piece of board, hang it up by any point, then a plumb-line suspended from the same point will pass through the centre of gravity; therefore mark that line upon it: and after suspending the body by another point, apply the plummet to find another such line, then will their intersection shew the centre of gravity.

Or thus: hang the body by two strings from the same point fixed to different parts of the body; then a plummet hung from the same tack will fall on the centre of gravity.

Another method: Lay the body on the edge of a triangular prism, or such like, moving it to and fro till the parts on both sides are in equilibrio, and mark a line upon it close by the edge of the prism: balance it again in another position, and mark the fresh line by the edge of the prism; the vertical line passing through the intersection of these lines, will likewise pass through the centre of gravity. The same thing may be effected by laying the body on a table, till it is just ready to fall off, and then marking a line upon it by the edge of the table: this done in two positions of the body, will in like manner point out the centre of gravity.

When a plane or a line can be so drawn as to divide a solid or a plane into two parts equal and similar, or so that its moleculæ shall be disposed two by two, in the same manner, with respect to such plane or such line, we may call the body symmetrical with regard to that plane or axis. And in all such bodies, it is obvious that the sum of the moments of its several moleculæ with relation to such plane or axis, will be nothing: for, if we take two particles disposed in the same manner but on different sides, their moments will be equal but with contrary signs; and, consequently, their sum will be equal to *zero*: and the same may be shewn of every other pair of moleculæ, similarly situated: whence, as (by hyp.) there are none but what are similarly situated, the resultant of the system will be in such plane, or line, and, of consequence, its centre of gravity will be there also. The same reasoning may be extended to the centre of figure or of magnitude, that is, the point with respect to which a whole body shall be symmetrical. Hence we conclude that the centre of gravity of a right line, or of a parallelogram, prism, or cylinder, is in its middle point; as is, also, that of a circle, or of its circumference, or of a sphere, or of a regular polygon; that the centre of gravity of a triangle is somewhere in a line drawn from any angle to the middle of the opposite side; that of an ellipse, a parabola, a cone, a conoid, a spheroid, &c. somewhere in its axis. And the same of all symmetrical figures whatever.

PROP. *To deduce some general theorems which may be useful in finding the centre of gravity of any proposed body.*

The determination of the centre of gravity, being reduced to that of the centre of parallel forces, we may here adopt the common theorem

for the moments. From which it will follow, that if p, p', p'', &c. (fig. 11. Pl. 38.) be equal material particles, and g the point through which the resultant R of the gravitating forces upon these particles always passes; and ABCD be a vertical plane, on which perpendiculars from $p, p' p''$, and g are let fall, then will the sum of the products of the forces upon p, p', p'', into their respective distances from A B C D, be equal to the product of the resultant R into its distance, where the force R would be equal to those upon $p+p'+p''$. The same would likewise obviously hold with respect to perpendiculars upon the other plane A E C G: and since the same will also obtain with relation to any vertical plane, although the position of p, p', and p'' be changed, provided they retain their relative situations, it will of course obtain when the position of the system is so varied that A E B F becomes a vertical plane: consequently the equality of the products may be affirmed with regard to all the three planes at the same time, and if the distances from the several planes be referred to the rectangular co-ordinates AX, AY, AZ, we may readily appropriate the equations to our present purpose. Denote the force of gravity by g, the distances referred to AX by d, d', d'', &c. the distances referred to AY, by D, D′, D″, &c. and those referred to Z by $\delta, \delta', \delta''$, &c. the distances from the centre of parallel forces to the same axis being denoted to X, Y, and Z: then we shall have

$$RX = gp\,d + gp'd' + gp''d'' + \&c.$$
$$RY = gp\,D + gp'D' + gp''D'' + \&c.$$
$$RZ = gp\,\delta + gp'\delta' + gp''\delta'' + \&c.$$

But $R = gp + gp' + gp'' + \&c.$ and $M = p + p' + p'' + \&c.$ whence

$$(\text{I.})\ldots\begin{cases} X = \dfrac{pd + p'd' + p''d'' + \&c.}{M} \\ Y = \dfrac{p\,D + p'D' + p''D'' + \&c.}{M} \\ Z = \dfrac{p\delta + p'\delta' + p''\delta'' + \&c.}{M} \end{cases}$$

Here, if we adopt the language of fluxions, and put x, y, and z, for the variable distances from A upon AX, AY, and AZ, respectively, we may convert these equations into the following form, which will render them more useful in many investigations.

$$(\text{II.})\ldots\begin{cases} X = \dfrac{\text{fluent of } x\dot{M}}{\text{fluent of } \dot{M}} = \dfrac{\text{fluent } x\dot{M}}{M}. \\ Y = \dfrac{\text{fluent of } y\dot{M}}{\text{fluent of } \dot{M}} = \dfrac{\text{fluent } y\dot{M}}{M} \\ Z = \dfrac{\text{fluent of } z\dot{M}}{\text{fluent of } \dot{M}} = \dfrac{\text{fluent of } z\dot{M}}{M}. \end{cases}$$

As these values together determine only one point, we see that a body has but one centre of gravity; of which the three equations determine the three co-ordinates, and of consequence the distances of the centre from three planes respectively perpendicular to each other.

These results being entirely independent of g, that is, of the force of gravity, some philosophers have preferred the term centre of inertia to that of centre of gravity: other philosophers have, on account of other properties, preferred different terms, which will be mentioned as we proceed.

When it is required to find the centre of gravity of any line whatever, it is considered as composed of a series of material heavy particles contiguous to each other, and connected by a law which is expressed by the equation of the curve, with respect to any two rectangular co-ordinates x and y. In this case the centre of gravity will manifestly be in the same plane as the proposed line, so that the plane YAX may contain the centre of gravity, whence $Z=0$, and the value of y being deduced, from the equation of the curve in terms of y, the centre of gravity may be determined by these two equations:

$$(\text{III.})\ldots X = \frac{\text{flu. } x\dot{M}}{M} \ldots\ldots Y = \frac{\text{flu. } y\dot{M}}{M}$$

If the curve have two legs symmetrical with relation to any axe, then we may reckon the vertex of that axe the origin of the co-ordinates, and y being $=0$, we shall only require $X = \dfrac{\text{flu. } x\dot{M}}{M}$; but in this case, the fluxion of M the curve being $= \sqrt{\dot{x}^2 + \dot{y}^2}$, we have also,

$$(\text{IV.})\ldots X = \frac{\text{flu. } x\sqrt{\dot{x}^2 + \dot{y}^2}}{M}$$

If the figure is a plane, its centre of gravity will be in the same plane, and of course we may take $Z=0$: and because $\dot{M} = y\dot{x}$, our equations become,

$$(\text{V.})\ldots\begin{cases} X = \dfrac{\text{flu. } xy\dot{x}}{\text{flu. } y\dot{x}} = \dfrac{\text{flu. } xy\dot{x}}{M} \\ Y = \dfrac{\text{flu. } y^2\dot{x}}{\text{flu. } y\dot{x}} = \dfrac{\text{flu. } y^2\dot{x}}{M} \end{cases}$$

Here again, if the plane be symmetrical with respect to the axe, the equation for X will alone be wanted.

When the figure is the superficies of a body generated by the rotation of any line about an axis, then will $Y=0$, and $Z=0$: and putting $\pi = 3{\cdot}14159$, &c. $2\pi y$ will denote the circumference of the generating circle, and $2\pi y\dot{M}$ the fluxion of the surface, wherefore

$$(\text{VI.})\ldots X = \frac{\text{flu. } 2\pi y x\dot{M}}{\text{flu. } 2\pi y\dot{M}} = \frac{\text{flu. } yx\dot{M}}{\text{flu. } y\dot{M}}.$$

When the figure is a solid of revolution, the centre of gravity being upon its axis, we have $Y=0$, $Z=0$: and πy^2 denoting the area of the circle whose radius is y, and $\pi y^2\dot{x} = \dot{M}$ the fluxion of the solid, we readily find,

$$(\text{VII.})\ldots X = \frac{\text{flu. } \pi y^2 x\dot{x}}{\text{flu. } \pi y^2\dot{x}} = \frac{\text{flu. } y^2 x\dot{x}}{\text{flu. } y^2\dot{x}}.$$

Cor. When $X=0$, $Y=0$, $Z=0$; that is, when the centre of gravity is at the origin of the co-ordinates, the equations (I.) will give $pd + p'd' + p''d'' + \&c. = 0$, or $d + d' + d'' + \&c. = 0$: in like manner, $D + D' + D'' + \&c. = 0$: and the same will hold with respect to any other co-ordinates whose origin is the centre of gravity; that is, the sum of perpendiculars from all the particles affected with contrary signs as they lie on different sides of either axis is then equal to zero: and consequently, if on any plane passing through the centre of gravity of a body perpendiculars be let fall from each of its moleculæ, the sum of all the perpendicular distances on one side of the plane will be equal to the sum of all those on the other side.

For examples of the use of these theorems, see Gregory's Mechanics, book i. chap. 3. See also, Simpson's Fluxions, Vince's Fluxions, Hutton's Course, vol. ii. &c.

The centre of gravity of a right line, parallelogram, prism, and cylinder, is, as before stated, in the middle. In a triangle the distance of this centre from the vertex is $\frac{2}{3}$ of the line bisecting the opposite side. In a trapezium the centre of gravity is found by dividing it into triangles, and finding the common centre of gravity of the two. In a circular sector, as arch : chord : : $\frac{2}{3}$ radius : distance of the centre of gravity from the centre. In a parabola this centre is on the axis at $\frac{3}{5}$ of its length from the vertex. In the cone and pyramid, the distance of the centre of gravity from the vertex is $\frac{3}{4}$ of the axis. And the altitude of the segment of a sphere, or spheroid, or conoid being x, and a the whole of that axis itself; then the distance of the centre of gravity in each of these bodies from the vertex will be as follows, viz.

$\frac{4a-3x}{6a-4x}x$ in the sphere or spheroid,

$\frac{5}{8}x$ in the semisphere or semispheroid,

$\frac{2}{3}x$ in the parabolic conoid,

$\frac{4a+3x}{6a+3x}x$ in the hyperbolic conoid.

The position, distance, and motion, of the centre of gravity of any body, is a medium of the positions, distances, and motions of all the particles in the body. This property of the centre of gravity has occasioned it to be called by some authors, *the centre of position*, by others *the centre of mean distances*.

The common centre of gravity of two bodies, is that point in the right line joining them, which divides it in the reciprocal ratio of their magnitudes. The common centre of gravity of three or more bodies, is found by considering the first and second as a single body, equal to their sums, and placed in their common centre of gravity, determining the centre of gravity of this imaginary body and the third; and proceeding in the same manner for any greater number of bodies. The common centre of gravity of three or more bodies will be the same (if found by the above rule) by whatever steps it be determined.

The centre of gravity of a system of bodies moving without disturbance, is either at rest, or moving uniformly in a right line. The place of the centre of gravity of three or more bodies is not affected by any reciprocal action among them.

Uses of the Centre of Gravity.—This point is of the greatest use in mechanics, and many important concerns in life, because its place is to be considered as the place of the body itself in computing mechanical effects; as in the oblique pressures of bodies, banks of earth, arches of bridges, and such like.

The same centre is even useful in finding the superficial and solid contents of bodies. See CENTRO-BARYC.

CENTRE OF GYRATION, is that point in which if the whole mass be collected, the same angular velocity will be generated in the same time, by a given force acting at any place, as in the body or system itself. This point differs from the centre of oscillation, in as much as in this latter case the motion of the body is produced by the gravity of its own particles, but in the case of the centre of gyration the body is put in motion by some other force acting at one place only.

If p denote any particle of a body, placed at the distance d from the axis of motion; then is SR (the distance from S the point of suspension to R the centre of gyration) $=\frac{\text{sum of all the } p\,d^2}{\text{body } b}$; from whence the point R may be determined in bodies by means of fluxions.

The distance of the centre of gyration from the point or axis of motion, is a mean proportional between the distances of the centres of gravity and oscillation from the same axis. Hence, when any two of these distances is known, the third may readily be determined.

The distance SR of the centre of gyration from the axis of rotation in several bodies will be as follows:

1. In a right line, or thin cylinder, revolving about the end, SR = length $\times \sqrt{\frac{1}{3}}$.
2. The plane of a circle, or cylinder, revolving about the axis, SR = radius $\times \sqrt{\frac{1}{2}}$.
3. The periphery of a circle, about the diameter, SR = radius $\times \sqrt{\frac{1}{2}}$.
4. A wheel with a very thin rim, revolving about its axle, SR = radius.
5. The plane of a circle, about the diameter, SR = $\frac{1}{2}$ radius.
6. The surface of a sphere, about the diameter, SR = radius $\times \sqrt{\frac{2}{3}}$.
7. A globe, about the diameter, SR = rad. $\times \sqrt{\frac{2}{5}}$.
8. In a cone, about the axis, SR = rad. $\times \sqrt{\frac{3}{10}}$.

CENTRE OF INERTIA. See CENTRE OF GRAVITY.

CENTRE OF MAGNITUDE, is the point which is equally distant from the similar external parts of a body.

CENTRE OF MEAN DISTANCES. See CENTRE OF GRAVITY.

CENTRE OF MOTION, that point which remains at rest, while all the points of a body move about it. And this is the same in uniform bodies of the same matter throughout, as the centre of gravity.

CENTRE OF OSCILLATION, is that point in the axis of suspension of a vibrating body, in which, if all the matter of the system were collected, any force applied there would generate the same angular velocity in a given time as the same force at the centre of gravity, the parts of the system revolving in their respective places.

Or, since the force of gravity upon the whole body may be considered as a single force (equivalent to the weight of the body) applied at its centre of gravity, the centre of oscillation is that point in a vibrating body into which if the whole were concentrated and attached to the same axis of motion, it would then vibrate in the same time the body does in its natural state.

Let several bodies oscillate about the point S (fig. 12. Pl. 38.) as if the mass of each were concentrated into the points A, B, C; referred to the same plane perpendicular to the axis of motion, merely to facilitate the investigation. The action exerted by gravity upon each of them may be decomposed into two forces, of which one whose direction passes through the centre of suspension is destroyed by its resistance; the other is perpendicular in direction to the former, and is alone efficacious in moving the body or system. Now gravity tends to impress the same velocity upon the points A, B, C, in the vertical direction; this velocity we shall denote by g, and by m, n, p, the sines of the angles which the supposed inflexible bars SA, SB, SC, form with the vertical SL. Drawing AM, BN, CP, parallel to AL and each

equal to g, they will represent the accelerating forces of the points A, B, C, or the spaces which they would describe in the first unit of time if they were left to themselves. But because of the obliquity of these forces upon SA, SB, SC, if the rectangles am, bn, cp, be constructed, the spaces run over will be only Aa, Bb, Cc; and as the angles AMa, BNb, CPc, have for their sines m, n, p, we shall have $Aa=gm$, $Bb=gn$, $Cc=gp$. Hence it follows, that the bodies A, B, C, taken separately, move with different velocities. But if we suppose them connected together in an invariable manner, so that they all perform their vibrations in the same time, the velocity of some will be augmented while that of others will be diminished; and as the aggregate of the forces which solicit the system is always the same, it is necessary that the sum of the motions lost should be equal to that of the motions gained; or that the sum of the motions lost should be equal to zero, considering the former as positive, the latter as negative.

Let us represent by A, B, C, the masses of the three bodies, by a, b, c, their distances from the point of suspension, and by α, β, γ, the initial velocities which they lose; the quantities of motion lost will be $A\alpha$, $B\beta$, $C\gamma$, which must be in equilibrio, therefore the sum of their moments taken with regard to the point S is nothing; and as these respective distances from that point are a, b, c, we shall have

$$Aa\alpha+Bb\beta+Cc\gamma=0.$$

Let f be the velocity which the point A subjected to the laws of the system would receive in the first unit of time; as all the points describe similar arcs, their initial velocities are proportional to the distances from the centre of suspension; therefore that of B will be $\frac{bf}{a}$ and that of C will be $\frac{cf}{a}$. Now the velocity lost by each body is equal to the velocity which it would have had *minus* that which it really has; therefore $\alpha=gm-f$, $\beta=gn-\frac{bf}{a}$, $\gamma=gp-\frac{cf}{a}$: whence, by substituting these values in the preceding equation, we have

$$Aa\,(gm-f)+Bb\left(gn-\frac{bf}{a}\right)+Cc\left(gp-\frac{cf}{a}\right)=0.$$

Multiplying by a to clear this equation of fractions, and finding the value of f, we have

$$f=\frac{g(Aa^2m+Babn+Cacp)}{Aa^2+Bb^2+Cc^2}.$$

From the points A, B, C, let fall the perpendiculars AI, BK, CL, upon SL, and from the centre of gravity, H, of the system demit HG perpendicular to the same line. The sum of the moments of the weights A, B, C, referred to the point S, is equal to the moment of their resultant which passes through the point H; therefore

$$A.AI+B.BK+C.CL=(A+B+C)\ HG.$$

The triangles SAI, SBK, SCL, SHG, give, putting $SH=h$, and the sine of the angle HSG equal to r,

$AI=AS$ sin. $ASI=am$, $BK=BS$ sin. $BSK=bn$,
$CL=CS$ sin. $CSL=cp$, $HG=SG$ sin. $GSH=hr$.

Substituting, therefore, instead of these lines their values in the preceding equation, we have

$$Aam+Bbn+Ccp=(A+B+C)\ hr;$$

whence there results

$$f=\frac{ga\,(A+B+C)\ hr}{Aa^2+Bb^2+Cc^2}.$$

To ascertain the actual position of the point whose invariable connection with the system does not change its velocity, let x be its distance from the centre of suspension, and S the sine of the angle which the inflexible rod that retains it to that point makes with the vertical: its accelerating force when it moves singly is gs; in the contrary case it is proportional to its distance from the point S, and of consequence is equal to $\frac{x}{a}f$: but these two forces, or the initial velocities they produce, must be equal; therefore $\frac{x}{a}=gs$, or, putting the preceding value of f for it, there arises

$$\frac{(A+B+C)\,ghrx}{Aa^2+Bb^2+Cc^2}=gs:$$

from which we find

$$x=\frac{s}{r}\cdot\frac{Aa^2+Bb^2+Cc^2}{(A+B+C)\ h}.$$

That the point sought may be the centre of oscillation, it is not merely necessary that these two velocities be equal in the first instant, they must continue so in every instant of the descent: therefore x remaining the same, this equation should have place whatever be the position of the point sought, and that of the centre of gravity, relatively to the vertical, that is to say, whatever be s and r, the ratio $\frac{s}{r}$ is therefore constant; and consequently we have at the same time $r=0$, $s=0$; which shews that the centre of oscillation, the centre of gravity, and the point of suspension are in one and the same right line. Hence it results that $s=r$, and that

$$x=\frac{Aa^2+Bb^2+Cc^2}{(A+B+C)\ h}.$$

The same kind of reasoning applies exactly, however many the number of particles may be: therefore, to find the centre of oscillation of a system of particles or of bodies, we must multiply the weight of each of them by the square of its distance from the point of suspension, and divide the sum of these products by the weights multiplied by the distance of the centre of gravity from the centre of suspension: this quotient expresses the distance of the centre of oscillation from the point of suspension measured on the continuation of the line joining the centre of gravity and that point.

• If a body be turned about its centre of gravity in a direction perpendicular to the axis of motion, the place of the centre of motion will remain unaltered.

If the centre of oscillation be made the point of suspension, the point of suspension will become the centre of oscillation.

The centres of oscillation for various figures, vibrating flatways, are as expressed below, viz.

Nature of the Figure.	*When suspended by Vertex.*
Isosceles triangle	$\frac{3}{4}$ of its altitude
Common parabola	$\frac{5}{7}$ of its altitude
Any parabola	$\frac{2m+1}{3m+1}\times$ its altitude.

As to figures moved laterally or sideways, or edgeways, that is about an axis perpendicular to the plane of the figure, the finding the centre of oscillation is difficult; because all the parts of the weight in the same horizontal plane, on account of their unequal distances from the point of suspension, do not move with the same velocity; as is shewn by Huygens, in his Horol. Oscil. He

found, in this case, the distance of the centre of oscillation below the axis, viz.

In a circle,	-	$\frac{3}{4}$ of the diameter:
In a rectangle, susp. by one angle,	-	$\frac{2}{3}$ of the diagonal:
In a parabola susp. by its vertex	-	$\frac{5}{7}$ axis $+ \frac{1}{3}$ param.
The same susp. by mid. of base,	-	$\frac{4}{7}$ axis $+ \frac{1}{2}$ param.
In a sector of a circle		$\frac{3 \text{ arc} \times \text{radius}}{4 \text{ chord}}$:
In a cone	-	$\frac{4}{5}$ axis $+ \frac{\text{radius base}^2}{5 \text{ axis}}$:
In a sphere	-	$g + \frac{2r^2}{5g}$, where r is the

radius, and $g = a + r$ the rad. added to the length of the threads.

See also Simpson's Fluxions, art. 183, &c. Gregory's Mechanics, book ii. ch. 4.

Stone, in his Fluxions, and Emerson, in his Mechanics, make the centre of oscillation of a cone to be at $\frac{4}{5}$ of its axis from the vertex, proceeding upon the erroneous supposition that every particle in the cone's base moves with equal velocity: but it appears from what is done in the Gentleman's Diary for 1805, p. 34. that the centre of oscillation cannot fall within the cone at all unless the altitude be greater than the semidiameter of the cone's base; and when the altitude and semibase are equal, the centre of the base is the centre of oscillation, but when the semidiameter of the base exceeds the altitude it always falls below the base. The same conclusions may also be readily deduced from the above expression for the centre of oscillation of a cone.

To find the Centre of Oscillation Mechanically or Experimentally. Make the body oscillate about its point of suspension; and hang up also a simple pendulum of such a length that it may vibrate or just keep time with the other body: then the length of the simple pendulum is equal to the distance of the centre of oscillation of the body below the point of suspension.

Or it will be still better found thus: suspend the body very freely by the given point, and make it vibrate in small arcs, counting the vibrations it makes in any portion of time, as a minute, by a good stop watch; and let that number of oscillations made in a minute be called n: then shall the distance of the centre of oscillation be $OS = \frac{140850}{nn}$ inches. For, the length of the pendulum vibrating seconds, or 60 times in a minute, being $39\frac{1}{8}$ inches, and the lengths of pendulums being reciprocally as the square of the number of vibrations made in the same time therefore $n^2 : 60^2 :: 39\frac{1}{8} : \frac{140850}{nn}$ the length of the pendulum which vibrates n times in a minute, or the distance of the centre of oscillation below the axis of motion.

Centre of percussion of a body revolving about an axis, is that point at which if it struck an immoveable obstacle, all its motion would be destroyed, or it would incline neither way. Or, it is the point where we may suppose the whole rotatory momentum of the body accumulated. Every particle of a body turning on an axis being moving in a particular direction with a velocity proportional to its distance from the axis of rotation, if the body were stopped in any point, each particle tending o continue its motion would endeavour to drag the rest along with it. But whatever point we call the centre of percussion should have this property, that when it is stopped by a sufficient force, the whole motion and tendency to motion of every kind should be destroyed; so that, if at that instant the supports of the axis were annihilated, the body would remain in absolute rest.

If a pendulum vibrating with a given angular velocity strike an obstacle, the effect of the impact will be the greatest when it is made at the centre of percussion. For, in this case, the obstacle receives the whole revolving motion of the pendulum; whereas, if the blow be struck in any other point, a part of the pendulum's motion will be employed in endeavouring to continue its rotation.

The distance of the centre of percussion from the axis of motion is equal to the distance of the centre of oscillation from the same; that is, when the centre of percussion is required in a plane passing through the axis of motion and centre of gravity; and in all such cases the centre of percussion will be found in a line passing through the centre of oscillation parallel to the axis of motion: but it is only in a few regular bodies, in which the sums of the momenta on the right and on the left are equal, that the centres of percussion and oscillation coincide.

If the centre of percussion of a regular shaped body be required in any plane passing through the axis of motion; erect from the centre of oscillation a perpendicular to the plane in which both the axis of motion and centre of oscillation are found; and this perpendicular will pierce the required plane in the centre of percussion. So that a body has various centres of percussion, according to the plane passing through the axis of motion, in which the impact is made; and a right line is the locus of these varying centres.

When all the parts of the striking body, instead of oscillating about a centre of suspension, are moving with the same velocity and in parallel directions, the centre of percussion coincides with the centre of gravity.

Centre (Phonic), in acoustics, is the place where a speaker should be situated, in articulating echoes that repeat many syllables.

Centre (Phonocamptic), is the place or the obstacle that reflects the sonorous rays.

Centre of position. See Centre of gravity.

Centre of pressure, of a fluid against a plane, is that point to which if a force equal to the whole pressure were applied, but in a contrary direction, it would keep the surface at rest. The centre of pressure upon a plane parallel to the horizon, or upon any plane where the pressure is uniform, is the same as the centre of gravity of that plane. And it is commonly said, that the centre of pressure is the same with the centre of percussion, supposing the axis of motion to be at the intersection of the plane which sustains the pressure, with the surface of the fluid: but the demonstration usually given does not prove that the centres of pressure and percussion coincide, but only that these points are at the same distance from the axis of motion. "If a line be drawn from the centre of a plane, perpendicularly to the intersection of the plane produced, and the surface of the fluid, then (considering this intersection as the axis of motion) the centre of percussion is somewhere situated in that line, but it does not necessarily follow that the centre of

pressure is in the same line; for the pressure of the fluid may cause the body to revolve round this line. In particular cases, however, these centres do coincide. Monthly Rev. xxv. N.S.

Centre of spontaneous rotation, is that point which remains at rest the instant a body is struck, or about which the body begins to revolve. This term was first employed by John Bernoulli, to distinguish the centre from the centre of forced rotation, or that about which a body is compelled to revolve, the point of suspension of a pendulum, for example.

To Ce'ntre. *v. a.* (from the noun.) 1. To place on a centre; to fix as on a centre (*Milton*). 2. To collect to a point (*Prior*).

To Ce'ntre. *v. n.* 1. To rest on; to repose on (*Atterbury*). 2. To be placed in the midst or centre (*Mil.*) 3. To be collected to a point (*Dryden*).

CE'NTRICK. *a.* (from *centre.*) Placed in the centre (*Donne*).

CENTRIFU'GAL. *a.* (from *centrum* and *fugio.*) Having the quality acquired by bodies in motion, of receding from the centre (*Cheyne*).

Centrifugal force, is that whereby a body revolving round a centre, endeavours to recede from it.

It is one of the established laws of nature, that all motion is of itself rectilinear; and that the moving body never recedes from its first right line, till some new impulse be superadded in a different direction: after that new impulse, the motion becomes compounded, but it continues still rectilinear, though the direction of the line be altered. To move in a curve, it must receive a new impulse, and that in a different direction every moment; a curve not being reducible to right lines, unless infinitely small ones. If then a body continually drawn towards a centre be projected in a line that does not go through that centre, it will describe a curve; in each point whereof it will endeavour to recede from the curve, and proceed in the tangent AD; and, if nothing hindered, it would actually proceed; so as in the same time wherein it describes the arch AE, it would recede the length of the line DE, perpendicular to AD, by its centrifugal force. Pl. 38. fig. 1.

Centrifugal machine, a curious machine invented by a Mr. Erskine, for raising water by means of a centrifugal force, combined with the pressure of the atmosphere. This machine consists of a large tube of copper, &c. in the form of a cross, placed perpendicularly in the water, and resting at the bottom on a pivot. At the upper part of the tube is an horizontal cog-wheel, which touches the cogs of another in a vertical position; so that by the aid of a double winch, the whole machine is moved round with very great velocity. Near the bottom of the perpendicular part of the tube is a valve opening upwards; and near the two extremities, but on the contrary sides of the arms, or cross part of the tube, are two other valves opening outwards. These two valves are kept shut, by means of springs, till the machine is put in motion; when the centrifugal velocity of the water forces them open, and discharges itself into a cistern or reservoir placed there for that purpose. On the upper part of the arm are two holes, which are closed by pieces that screw into the metal of the tube. Before the machine can work, these holes must be opened, and water poured in through them, till the whole tube be full: by these means all the air will be forced out of the machine, and the water supported in the tube by means of the valve at the bottom. The tube being thus filled with water, and the holes closed by their screw-caps, it is turned round by the winch; when the water in the arms of the tube acquires a centrifugal force, opens the valves near the extremities of the arms, and flies out with a velocity nearly equal to that of the extremities of the said arms. The theory of this machine has been exhibited in Leybourn's Mathematical Repository, and in Gregory's Mechanics, book v. ch. 4.

CENTRINA. See Squalus centrina.

CENTRIPE'TAL. *a.* (from *centrum* and *peto.*) Having a tendency to the centre (*Cheyne*).

Centripetal force, that force by which a body is every where impelled, or any how tends towards some point as a centre; such is gravity, or that force whereby bodies tend towards the centre of the earth; magnetical attraction, whereby the loadstone draws iron; and that force, whatever it be, whereby the planets are continually drawn back from right-lined motions, and made to move in curves. See Central forces.

CENTRISCUS. In zoology, a genus of the class pisces, order branchiostega. Head lengthened into a very narrow snout; mouth without teeth; lower jaw longer, aperture of the gills broad, flat; body compressed; belly carinate; ventrical fins united.

Three species. See Nat. Hist. Pl. LIII.

1. C. scutatus. Back covered with a smooth bony shell, of a golden hue, the plates closely united; the hind part armed with a long, spear-like point; head oblong; snout tubular, bent up; eyes with a nictitant membrane, and near the nostrils which are double; gill-cover smooth, pellucid, horny, the aperture lateral and large. Inhabits the Indian seas: from six to eight inches long; feeds on mud, and small aquatic animals; body thin, pellucid near the back; above brownish; the sides yellow mixed with silver; beneath reddish and marked with transverse white lines.

2. C. scolopax. Body scaly, rough; tail straight, extended. Inhabits the Mediterranean sea; a span long. Body pale-red, broad, rough, with hard, pointed, closely-imbricate scales: flesh eatable.

3. C. valitasius. Body oblong, lanceolate, rough, with small recumbent bristles at the nostrils. Inhabits Amboina; two inches long; body silvery; above yellowish-grey; triangularly carinate before the ventral fins.

CENTRO-BARYC METHOD, (from κεντρον and βαρυς, heavy), in mechanics, is a method of measuring or determining the quantity of a surface, or a solid, by considering it as

formed by motion, and multiplying it into the way of its centre of gravity. The doctrine is comprised in the following theorem, with its corollaries.

Every figure, whether superficial or solid, generated by the motion of a line or figure, is equal to the factum of the generating magnitude into the way of its centre of gravity, or the line which its centre of gravity describes.

This may be demonstrated very concisely by means of the two values of Y given in formula III. and V. CENTRE OF GRAVITY. Annexing the co-efficient $2\pi = 3\cdot141593 \times 2$, to both numerator and denominator will not change the value of the fractions; they may, therefore, be expressed thus:

$$Y = \frac{\int 2\pi\ y\dot{M}}{2\pi M} \ldots\ldots Y = \frac{\int 2\pi y^2 \dot{x}}{2\pi M}.$$

The first of these equations expresses the distance from the axe of the centre of gravity of any line: a simple transformation gives us $2\pi Y M = \int 2\pi y \dot{M}$, where $2\pi Y$ is the circumference of which Y is the radius, and is that which is decribed by the centre of gravity of M if that curve be made to turn about the same line as an axis: moreover $\int 2\pi y \dot{M}$ is the expression for the area of the surface which is generated by the arc M during this rotation. Consequently, the surface generated by the rotation of any given curve about an axis is equal to the product of the generating arc into the circumference described by its centre of gravity.

From the second of these formulæ we have $2\pi Y M = \int 2\pi y^2 \dot{x}$; where if we suppose a revolution upon the same axis AX, the area of which the algebraic expression is M or $y\dot{x}$, generates a solid denoted by $\int 2\pi y^2 \dot{x}$, and the centre of gravity will describe the circumference $2\pi Y$. Therefore the solid generated by the rotation of any plane figure about an axis, has for its capacity the product of the generating area into the circumference described by its centre of gravity.

If instead of 2π we introduced any fraction, $\frac{1}{n}\pi$, into the numerators and denominators of the same formulæ, it would thence be equally obvious that the same property was applicable to the curve surfaces or the capacities of figures generated by a partial revolution about a fixed axis. And if many curves comprised in the same plane generate at once as many surfaces and solids, we may apply the same proposition, by taking the common centre of gravity of the system.

For example, it was found above at art. CENTRE OF GRAVITY, that in a semicircle, the distance of the centre of gravity from the centre of the circle, is $\frac{4r}{3p}$; and, therefore, the path of that centre, or circumference described by it whilst the semicircle revolves about its diameter, is $\frac{8}{3}r$; also the area of the semicircle is $\frac{1}{2}pr^2$; hence the product of the two is $\frac{4}{3}pr^3$, which, it is well known, is equal to the solidity of the sphere generated by the revolution of the semicircle.

And hence, also, is obtained another method of finding mathematically the centre of gravity of a line or plane, from the contents of the superficies or solid generated by it. For if the generated superficies or solid be divided by the generating line or plane, the quotient will be the circumference described by the centre of gravity; and consequently this divided by $2p$ gives the radius, or distance of that centre from the axis of rotation. So, in the semicircle, whose area is $\frac{1}{2}pr^2$, and the content of the sphere generated by it $\frac{4}{3}pr^3$; here the latter divided by the former is $\frac{8}{3}r$, and this divided by $2p$ gives $\frac{4r}{3p}$ for the distance of the centre of gravity from the axis, or from the centre of the semicircle. For more examples, see Gregory's Mechanics, Hutton's Mensuration, and Wallis's Treatise de Calculo Centri Gravitatis.

This elegant theorem was first noticed by Pappus in the preface to the 7th book of his Collections; but the Jesuit Guldinus was the first who set it in a proper point of view. Since his time it has been used by many in measuring the surfaces and capacities of solids of rotation; and it may often be employed with facility when the integral calculus would be difficult. Indeed, as Mr. Leibnitz remarked, the method will hold, though the axis or centre be continually changed during the generative motion.

CENTROGASTER. In zoology, a genus of the class pisces, order thoracica. Head compressed, smooth; gill-membrane mostly seven-rayed; body depressed smooth; fins spinous: ventral connected by a membrane, with four sharp spines and six soft rays. Four species. Inhabitants of the Red Sea, or the coasts of Japan: generally about five inches long, with silvery body and small scales.

CENTRUM. See CENTRE.

CENTRUM OVALE. In anatomy. When the two hemispheres of the brain are removed on a line with the level of the corpus callosum, the internal medullary part presents a somewhat oval centre; hence it is called *centrum ovale*. Vieussens supposed all the medullary fibres met at this place.

CENTRUM TENDINOSUM. The tendinous centre of the diaphragm is so called. See DIAPHRAGM.

CENTRY. See CENTINEL.

CENTUMNODIA, (*centumnodia*, from *centum*, a hundred, and *nodus*, a knot; so called from its many knots or joints.) Common knot-grass. This plant, polygonum aviculare; floribus octandris trigynis axillaribus, foliis lanceolatis, caule procumbente herbaceo, of Linnéus, is never used in this country; it is said to be useful in stopping hæmorrhages, diarrhœas, &c. but little credit is to be given to what is said of it. See POLYGONUM.

CENTUMVIRI, in Roman antiquity, judges appointed to decide common causes among the people. They were chosen three out of each tribe; and though five more than an hundred, were nevertheless called *centumviri*, from the round number, *centum*, an hundred.

CENTUNCULUS. Chaff-weed. In botany, a genus of the class tetrandria, order monogynia. Calyx four-cleft; corol four-cleft, inferior, tubular, with a spreading border; stamens short, naked; capsule one-celled, opening transversely, many-seeded. One species only; found wild on the watery heaths of this country.

CE'NTUPLE. *a.* (*centuplex*, Latin.) A hundred-fold.

To CENTU'PLICATE. *v. a.* (*centum* and *plico*, Latin.) To make a hundred-fold.

To CENTU'RIATE. *v. a.* (*centurio*, Latin.) To divide into hundreds.

CENTURIA'TOR. *s.* (from *century*.) A name given to historians, who distinguish times by centuries (*Ayliffe*).

CENTURION, among the Romans, an officer in the infantry, who commanded a century, or an hundred men. In order to have a proper notion of the centurions, it must be remembered, that every one of the thirty *manipuli* in a legion was divided into two *ordines*, or ranks; and consequently the three bodies of the hastati, principes, and triarii, into 20 orders a-piece, as into 10 manipuli. Now, every manipulus was allowed two centurions, or captains, one to each order or century: and, to determine the point of priority between them, they were created at two different elections. The 30 who were made first always took the precedency of their fellows; and therefore commanded the right-hand orders, as the others did the left. The triarii, or *pilani*, so called from their weapon the *pilum*, being esteemed the most honourable, had their centurions elected first, next to them the principes, and afterwards the hastati; whence they were called *primus et secundus pilus, primus et secundus princeps, primus et secundus hastatus*; and so on.

CENTURY, any thing divided or ranged into a hundred parts: as 100 men, 100 inventions, 100 years.

The time from the Christian æra is reckoned by centuries, as the first century, the second century, &c. It has been much disputed whether the nineteenth century began on the 1st of January 1800, or on the 1st of January 1801: we are decidedly of opinion that it began with the year 1801; but we do not think the point of sufficient consequence or difficulty, to justify our entering into a laboured defence of that opinion.

CEORLES, the name of one of the classes or orders into which the people were distinguished among the Anglo-Saxons. The ceorles, who were persons completely free, and descended from a long race of freemen, constituted a middle class between the labourers and mechanics (who were generally slaves, or descended from slaves) on the one hand, and the nobility on the other. They might go where they pleased, and pursue any way of life that was most agreeable to their humour; but so many of them applied to agriculture, and farming the lands of the nobility, that a ceorl was the most common name for a husbandman or farmer in those times.

CEAS, CEA, or CIA, in ancient geography, now Zia, one of the Cyclades, an island of the Ægean Sea, lying opposite to the promontory of Achaia called Sunium, and about 50 miles in compass.

CEPA, (*cepa*, from κήπος, a woolcard; from the likeness of its roots according to Minshew, but the derivation seems fanciful.) The onion. This bulbous root belongs to the allium cepa; scapo nudo inferne ventricosa longiore, foliis teretibus, of Linnéus. Onions are acrid and stimulating, and possess very little nutriment. With bilious constitutions they generally produce flatulency, thirst, headach, and febrile symptoms; but where the temperament is phlegmatic they are of infinite service, by stimulating the habit and promoting the natural secretions, particularly expectoration and urine. They are recommended in scorbutic cases, as possessing anti-scorbutic properties. Externally, onions are employed in suppurating poultices; and suppression of urine in children is said to be relieved by applying them, roasted, to the pubes. See ALLIUM.

CEPHAELIS. In botany, a genus of the class pentandria, order monogynia. Flowers in heads involucred; corol tubular; stigma two-parted; berry two-seeded; receptacle chaffy. Twelve species: all but c. violacea, which is indigenous to India, natives of the West Indies or South America.

CEPHALÆA, (κεφαλαια, from κεφαλη, the head). The flesh of the head that covers the scull. Also CEPHALALGIA, which see.

CEPHALALGIA, (κεφαλαλγια, from κεφαλη, the head, and αλγος, pain). Pain in the head. Head-ach.

CEPHALICS, (*cephalica, medicamenta*, κεφαλικα, from κεφαλη, the head). Remedies that relieve disorders in the head.

CEPHALIC VEIN. Vena cephalica. (So called, because the head was supposed to be relieved by opening it.) The anterior vein of the arm that receives the cephalic of the thumb.

CEPHALITIS, (*cephalitis*, from κεφαλη, the head, and ιτης, from ιεμαι, to propel forcibly, to irritate or inflame). Inflammation of the head. See PHRENITIS.

CEPHALANTHUS. Button-weed. In botany, a genus of the class tetrandria, order monogynia. Without common calyx; proper calyx superior, funnel-form; receptacle globular, hairy; capsule four-celled, not opening; seeds solitary. One species only: a North American shrub; with opposite branches; leaves opposite, and in threes; flowers in loose, terminal spikes or round heads.

CEPHALAPHORA. In botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle naked, hemispheric: seeds crown-

ed with many-leaved chaff: calyx many-leaved, reflected. One species only, a native of Chili.

CEPHALOID, (κεφαλοειδης, from κεφαλη, the head, and ειδος, like). In botany. Head-shaped, head-like; capitated, as the poppy.

CEPHALONIA. See Cefalonia.

CEPHALO-PHARYNGEUS. See Constrictor pharyngis superior.

CEPHALUS, in fabulous history, son of Deïoneus, king of Thessaly, by Diomede, daughter of Xuthus, married Procris, daughter of Erechtheus, king of Athens, and as some assert of Mercury and Herse. Aurora fell in love with him, and carried him away; but he refused to listen to her addresses, and was impatient to return to Procris. The goddess sent him back; and to try the fidelity of his wife, she made him put on a different form, and he arrived at the house of Procris in the habit of a merchant. Procris was deaf to every offer; till she suffered herself to be seduced by the gold of this stranger, who discovered himself the very moment that Procris had yielded up her virtue. This circumstance so shamed Procris, that she fled, and devoted herself to hunting. After this, Procris returned in disguise to Cephalus, who was willing to disgrace himself by some unnatural concessions to obtain a dog and the dart Procris had obtained of Diana. Procris discovered herself at the moment that Cephalus shewed himself faithless, and a reconciliation was easily made between them. They loved one another with more tenderness than before, and Cephalus received from his wife the presents of Diana. As he was particularly fond of hunting, he every morning repaired to the woods, and after much fatigue, laid himself down in the cool shade, and earnestly called for *Aura*, or the refreshing breeze. This ambiguous word was mistaken for a mistress; and some informer reported to the jealous Procris, that Cephalus daily paid a visit to a mistress, whose name was Aura. Procris believed the information, and secretly followed her husband into the woods. According to custom, Cephalus retired to the cool, and called after Aura. At the name of Aura, Procris eagerly lifted up her head to see her expected rival; her motion occasioned a rustling among the leaves of the bush that concealed her, Cephalus listened, and thinking it to be a wild beast, he let fly his unerring dart. Procris was struck to the heart, and instantly expired in the arms of her husband, confessing that ill-grounded jealousy was the cause of her death. (*Ovid. Hygin.*)—A Corinthian lawyer, who assisted Timoleon in regulating the republic of Syracuse.

CEPHEUS, in fabulous history, a king of Ethiopia, father of Andromeda, by Cassiope. He was one of the Argonauts, and was changed into a constellation after his death. (*Ovid. Met.*)

Cepheus, in astronomy, an old northern constellation. It is now reckoned to contain 0. 0. 3. 7. 10. 20., in all 40 stars of the first six magnitudes.

CEPHISUS and Cephissus, a celebrated river of Greece, that rises at Lilæa in Phocis, and after passing at the north of Delphi and mount Parnassus, enters Bœotia, where it flows into the lake Copais. The Graces were particularly fond of this river, whence they are called the goddesses of the Cephisus. There was a river of the same name in Attica, and another in Argolisi. (*Strab.*)

CEPION, in ancient music, the name of a particular air, designed to be played on the cithara.

CEPOLA. In zoology, a genus of the class pisces, order thoracica. Head roundish, compressed; teeth curved, in a single row; gill-membrane with six rays; body uniform, naked; the belly hardly as long as the head. Three species: inhabitants of the Mediterranean or Adriatic; generally found on marshy shores; between four or five feet long; feed on crabs and testaceous animals; flesh hardly eatable.

CERA, (*cera*, wax). Wax. Bees-wax. A solid concrete substance, collected from vegetables by bees; and extracted from their combs after the honey is got out, by heating and pressing them. With rectified spirit it forms, by the assistance of heat, a gelatinous liquid. It is perfectly insoluble in watery liquors. When melted, it assumes the appearance of oil, and in this state is easily combined with oils and liquid fats. It is very inflammable, and burns totally away. In the state in which it is obtained from the combs, it is called yellow wax, *cera flava*, and this, when new, is of a lively yellow colour, somewhat tough, yet easy to break: by age it loses its fine colour, and becomes harder and more brittle. Yellow wax, after being reduced into thin cakes, and bleached by a long exposure to the sun and open air, is again melted, and formed into round cakes, called virgin's wax, or white wax, *cera alba*. The chief medical use of wax is in plasters, unguents, and other like external applications, partly for giving the requisite consistence to other ingredients, and partly on account of its own emollient quality. See Wax.

CERAM, an island in the Indian ocean, one of the Moluccas, to the W. of New Guinea. It is 140 miles long and 40 broad. The Dutch have a fortress here. Lat. 3. 0 S. Lon. from 126 to 129 E.

CERAMBYX. In zoology, a genus of the class insecta, order coleoptera. Antennas setaceous; feelers four; thorax spinous or gibbous; shells linear. This is a very beautiful and finely variegated family; the larvas resemble soft, oblong, slender worms, with a scaly head and six hard legs on the fore-part. They bore through the interior of trees, pulverising the wood; and are transformed into perfect insects in the cavities they make: many of them diffuse a strong smell, perceivable at a great distance, and some, when taken, utter a kind of cry, produced by the friction of the thorax on the upper part of the abdomen and shells. The antennas are in some shorter, in others longer than the body, and in others, again, of an equal length. Nearly five hundred species; scattered over the globe; which are conveniently subdivided into the following sections:

A. with feelers equal to the length of the body, filiform. Of this section, those with cylindrical entire jaw are denominated by Fabricius, prionus: those only with an obtuse one-toothed jaw, cerambyx: those with a bifid horny jaw, lamia.

B. with feelers as above, capitate; thorax spinous. In the Fabrician system called rhagium.

C. with feelers as above, clavate; thorax unarmed. Callidium.

D. with feelers unequal; the two fore ones filiform; the hind ones clavate. Stenocorus. The shell, thorax, scutel and back of these insects offers, in different species, every possible variety of colour, and splendour: they are black, yellow, green, hyacinthine, violet, crimson, scarlet, orange and blue: often elegantly variegated and striated, dotted, or spotted: sometimes hairy, sometimes naked. This genus moreover comprehends insects of a size superior to any in the order coleoptera, except those in the genus scarabæus. We can select but a few examples.

1. C. longimanus. Long-limbed cerambyx. Wing-sheaths beset with a very fine brown, elegantly varied with red, black, and yellow, in differently arranged stripes; fore legs very long, strong, black, with broad red bars; antennas long and black. Length of the insect from head to tail three inches.

2. C. gigas. Giant cerambyx; wing-shells dark-brown; every other part black; the largest of the genus measuring from head to tail between six and seven inches.

3. C. cervicornis. Colour dark chesnut; jaws very long, curved, spined or serrated like those of the stag-beetle (lucanus cervus). A native of America and the West-India isles, where its larva, like that of the palm curculio, forms a luscious article of food. The more opulent are said sometimes to keep negroes for the sole purpose of going into the woods in search of them, and of scooping them out of the trees in which they reside: these trees are chiefly the plum, and silk-cotton: they are commonly known by the name dioecious. Male and female distinct. One species only; a tree indigenous to Sicily and the Levant, with primate leaves, leaflets roundish, entire, thick, legume compressed, fleshy, many celled, valveless.

CERAMICUS, a public walk, and a place to bury those that were killed in defence of their country, at Athens.

CERASA NIGRA, (*ceresa*, κερασος, the cherry tree; from κερασουντη, a town in Pontus, whence Lucullus first brought them to Rome; or from κερ, the heart; from its resemblance to it in shape and colour). The black cherry. The ripe fruit of the prunus ovium; umbellis sessilibus, foliis ovato-lanceolatis, subtus pubescentibus, conduplicatis, of Linnéus. The flavour of these is esteemed by many, and if not taken in too large quantities they are extremely salutary. A gum exudes from the tree, whose properties are similar to those of gum arabic. See PRUNUS.

CERASA RUBRA. The red cherry. The ripe fruit of the prunus cerasus; umbellis subpedunculatis, foliis ovatolanceolatis glabris conduplicatis, of Linnéus. This species possesses a pleasant, acidulated, sweet flavour, and is extremely proper in fevers, scurvy, and bilious obstructions. Red cherries are mostly eaten as a luxury, and are very wholesome, except to those whose bowels are remarkably irritable. See PRUNUS.

CERASTES. See COLUBER CERASTES.

CERASTIUM, in botany, English mouse-ear, or mouse-ear chickweed, a genus of the decandria pentagynia class and order. Natural order of caryophyllei. Essential character: calyx five-leaved; petals bifid; capsules unilocular, gaping at the tip. None of the mouse-ear chickweeds make much appearance, and are therefore only cultivated in botanic gardens. There are eighteen species. Some of them are common weeds in most parts of Europe; the smoother sorts are not disagreeable to cattle; the seeds are useful to birds.

CERASUS, (*untis*) a maritime city of Cappadocia, from which cherries were first brought to Rome by Lucullus. (*Mela.*)

CERATE, (*ceratum.*) A composition something harder than ointment, and softer than plaster. See CERATUM.

CE'RATED. *a.* (*ceratus*, Latin.) Waxed.

CERATION, a small Roman silver coin, the third part of an obolus. The same name was given by the ancients to a small weight, being a seed of ceratonia.

CERATO-GLOSSUS. See HYOGLOSSUS.

CERATONIA SILIQUA. The systematic name of the plant which affords the sweet-pod. See SILIQUA DULCIS.

CERATONIA. Corol-tree. St. John's bread. In botany, a genus of the class polygamia, order moecia. Herm: calyx five-parted, corolless; stamens five; stile filiform; legume coriaceous, many-seeded. The nuts are large; and the natives put stones into them, string them, and fasten them about their legs as an ornament when they dance.

CERATOPETALIUM. In botany, a genus of the class decandria, order monogynia. Calyx five-parted, permanent, bearing the stamens, petals five pinnatified; anthers sparred; capsule covered in the bottom of the calyx, two-celled. One species only; a tree of New Holland, with opposite, ternate leaves; terminal panicle.

CERATOPHYLLUM. Horn-wort. In botany, a genus of the class monoecia, order hexandria. Calyx many-parted, corolless. Male, stamens from sixteen to twenty: anthers oblong. Female, stigma one, nearly sessile; seed one, covered with bark. Two species, both natives of our own country, and aquatics.

1. C. demersum; found in our ponds, with fruit three-spined, segments of the calyx toothed.

2. C. submersum: found also in our ponds and ditches; with fruit unarmed; segment of the calyx entire.

CERATRIARPUS. In botany, a genus of the class monoecia, order monandria. Male: calyx two-parted; corolless. Female: one-leafed, carinate, permanent, two-horned; styles two; seed single, compressed, inclosed and covered by the calyx. One species only: a native of Tartary: a branching plant, with very narrow, sharp, grassy leaves.

CERATUM ALBUM. See CERATUM SPERMATIS CETI.

CERATUM CANTHARIDIS. This is a much milder preparation than the unguentum cantharidis, and is applied to keep up a discharge from blisters, where the skin is very irritable, and a milder stimulus wanted.

CERATUM CITRINUM. See CERATUM RESINÆ FLAVÆ.

CERATUM EPULOTICUM. See CERATUM LAPIDIS CALAMINARIS.

CERATUM LAPIDIS CALAMINARIS. The old name of this ointment was Turner's cerate, and ceratum epuloticum. It is calculated to promote the cicatrisation of ulcers.

CERATUM LITHARGYRI ACETATI. Cerate of litharge. This is recommended as a proper application to superficial ulcers, which are inflamed.

CERATUM RESINÆ FLAVÆ. Ceratum citrinum. This is merely a milder application than the unguentum resinæ flavæ.

CERATUM SAPONIS. Soap cerate; often applied round a fractured bone, it possessing a convenient degree of adhesiveness, and at the same time the usual properties of a saturnine remedy.

CERATUM SPERMATIS CETI. This preparation was formerly called ceratum album. It is an extremely mild and unctuous application, and may be applied with advantage to all ulcers, where no stimulating substance can be applied.

CERAULA, anciently a musician who played on the horn.

CERAUNIA, (κεραυνια, from κεραυνος, thunder). The thunder-stone; so called because it was supposed to be produced by a thunder-stroke. The term seems applicable to that peculiar stone generally combined with iron, which after having been ridiculed for ages as a mere fable of the ancient philosophers, is now fully ascertained to fall from the heavens on particular occasions:—but the cause of which is altogether unknown. Sky-stones. Meteoric-stones. See AEROLITHS.

CERBERA. In botany, a genus of the class pentandria, order monogynia. Corol twisted, drupe one-seeded. Six species; chiefly natives of Spanish America. The following are principally worth noticing:

1. C. ahovai: a native of Brasil; with lucid, succulent leaves, and terminal flowers. The wood stinks abominably, and the kernels are poisonous.

2. C. manghas, an Indian plant; leaves lanceolate, with transverse nerves. It bears two seeds as large as chesnuts and highly poisonous.

3. C. thevetia. A native of the isle of Cuba, with linear, very long, crowded leaves, of Maccaco's. In dressing them they are first opened and washed, and then carefully broiled over a charcoal fire. See Pl. XXXI.

4. C. cinnamomeus. Cinnamon cerambyx, less than c. cervicornis; colour pale ferruginous: thorax marked on each side by two spines; wing-shells tipped by a small projecting point. The odour of this insect resembles cinnamon, whence its name. Inhabits South America.

5. C. moschatus. Musk goat-chaffer. Colour fine dark green, with a slight gilded tinge on the upper parts, sometimes shot with a strong cast of blue or purple: antennas shorter than the body. Chiefly found in Europe on willows and poplars, in the decayed wood of which its larvas reside. Its specific name is given from its essential aroma: which, however, resembles rather the combined odour of roses, musk and ambergris, than of musk alone; and so powerful is it, that a handkerchief in which it has been wrapped up for some time, especially in the month of July, when it exists in its full perfection, will retain the scent for a whole day. It is often found in our own country, and measures in length about an inch and a quarter from its head to the end of its body. This insect when dried and reduced to powder proves as strong a vesciatory as the officinal cantharides.

6. C. violaceus. Thorax rounded, pubescent; body violet; antennas moderate; chest with a small projecting point; wing-shells linear, rounded at the tip, gibbous at the base: colour of lead, thorax and body sometimes greenish. Inhabits Europe, chiefly in fir timber, which has been felled some time and has not been stripped of its bark; bores serpentine cavities between the bark and the wood, which become larger in diameter as the insect increases in size; filling the space it leaves behind with its excrement, which resembles saw-dust.

CERBERUS, in fabulous history, a dog of Pluto, the fruit of Echidna's union with Typhon. He had 50 heads according to Hesiod, and three according to other mythologists. He was stationed at the entrance of hell, as a watchful keeper, to prevent the living from entering the infernal regions, and the dead from escaping from their confinement. It was usual for those heroes, who in their lifetime visited Pluto's kingdom, to appease the barking mouths of Cerberus with a cake. Orpheus lulled him to sleep with his lyre; and Hercules dragged him from hell when he went to redeem Alceste. (*Virg. Homer.* &c.)

CERBERUS ET RAMUS, in astronomy, a northern constellation. In the Britannic catalogue it is joined with Hercules. It contains 0. 0. 0. 3. 1. 5 i. e. 9 stars of the first six magnitudes.

CERCARIA. In zoology, a genus of the class vermes, order infusoria; worm invisible to the naked eye; pellucid, and furnished with a tail. Of this genus thirteen species have been remarked, for the most part changeable, but variable in form; some of them being convex, some globular, some cylindrical, tome triangular; some with an annulate, some with a setaceous, some with a forked tail. They are found in stagnant waters, marshes, salt-waters, animal infusions, whether of flesh, bones or muscles: occasionally in waters in which flowers have been kept, and at times in pure water. The species most worthy of notice seems to be c. mutabilis: changeful, cylindrical, green, or red, with a pointed, slightly bifid tail. Found in stagnant pools in such vast myriads as to cover the whole surface with a sheet of green or red; giving it sometimes the appearance of being tinged with blood. Its posture varies from a long cylindrical body larger in the middle to a nearly globular one: the extremities are pellucid.

CERCELE, in heraldry: a cross cercele is a cross which, opening at the ends, turns round both ways like a ram's horn. See CROSS.

CERCHNALEUM, (κερχναλεον, from κερχω, to wheeze). A wheezing of the trachea in respiration.

CERCHNORES, or CIRCHNUS. (κερχνωδες, κερχνος.) One who labours under a dense breathing, accompanied with a wheezing noise.

CERCIS. In botany, a genus of the class decandria, order monogynia. Calyx five-toothed, gibbous beneath; corol papillionaceous, with a short standard under the wings; legume oblong. Two species:

1. C. siliquastrum, with orbicular, heart-shaped leaves. A native of Italy and Spain.

2. C. canadensis, with heart-shaped, pointed leaves: a native of Virginia.

CERDICESORA, in ancient geography, the name of the place where Cerdic the Saxon leader landed, when he invaded Britain in 495; its situation was probably that now occupied by Charmouth in Devonshire.

CERDONIANS, in church history, persons who maintained most of the errors of Simon Magus, Saturnel, and other Gnostics. They asserted two principles, the one good, and the other evil: this last, according to them, was creator of the world, and the God that appeared under the old law; the first, whom they called unknown, was the father of Jesus Christ; who, they taught, was only incarnate in appearance, and was not born of a virgin, nor suffered death, but in appearance.

CERE, in ornithology, the membrane covering the base of the bill in birds, and which is generally coloured.

To CERE. *v. a.* (from *cera*, Lat. wax.) To wax (*Wiseman*).

CEREALIA, in antiquity, feasts of Ceres, held in different parts of Greece. What was common to all the cerealia was that they were celebrated with much purity; so that it was deemed a great pollution to meddle in conjugal matters, on those days. The cerealia passed from the Greeks to the Romans, who held them for 8 days successively, in the spring.

CEREBELLUM, (*cerebellum*, dim. of *cerebrum*). The little brain or cerebellum. A round viscus, of the same use as the brain; composed, like the brain, of a cortical and medullary substance, divided by a septum into a right and left lobe, and situated under the tentorium, in the inferior occipital fossa. In the cerebellum are to be observed the crura cerebelli, the fourth ventricle, the valvula magna cerebri, and the protuberant æ vermiformes.

CEREBRUM, (*quasi carabrum*; from καρα, the head). The brain. A large round viscus, divided superiorly into a right and left hemisphere, and inferiorly into six lobes, two anterior, two middle, and two posterior; situated within the cranium, and surrounded by the dura and pia mater, and tunica arachnoides. It is composed of a cortical substance, which is external; and a medullary, which is internal. It has three cavities called ventricles; two anterior or lateral, which are divided from each other by the septum licidum, and in which is the choroid plexus, formed of blood-vessels; the third ventricle is a space between the thalami nervorum opticorum. The principal prominences of the brain are, the corpus callosum, a medullary eminence, conspicuous upon laying aside the hemispheres of the brain; the corpora striata, two striated protuberances, one in the anterior part of each lateral ventricle; the thalami nervorum opticorum, two whitish eminences behind the former, which terminate in the optic nerves; the corpora quadrigemina, four medullary projections called by the ancients nates and testes; a little cerebrine tubercle lying upon the nates, called the pineal gland; and lastly, the crura cerebri, two medullary columns which proceed from the basis of the brain to the medulla oblongata. The cerebrine arteries are branches of the carotid and vertebral arteries. The veins of the head are called sinusses, which return their blood into the internal jugulars. The use of the brain is to give off nine pairs of nerves, through whose means the various senses are performed, and muscular motion excited. See ANATOMY.

CE'RECLOTH. *s.* (from *cere* and *cloth.*) Cloth smeared over with glutinous matter (*Bacon*).

CE'REMENT. *s.* (from *cera*, Latin, wax.) Cloths dipped in melted wax, with which dead bodies were infolded.

"Let me not burst in ignorance, but tell
Why canonized bones, buried in earth,
Have burst their *cerements*."

SHAKSPEARE.

CEREMO'NIAL. *a.* (from *ceremony.*) 1. Relating to ceremony; ritual (*South*). 2. Formal; observant of old forms (*Dryden*).

CEREMO'NIAL. *s.* (from *ceremony.*) 1. Outward form; external light (*Swift*). 2. The order for rites and forms in the Roman church.

CEREMO'NIALNESS. *s.* The quality of being ceremonial.

CEREMO'NIOUS. *a.* (from *ceremony*.) 1. Consisting of outward rites (*South*). 2. Full of ceremony; awful (*Shakspeare*). 3. Attentive to outward rites (*Shakspeare*). 4. Civil; formally respectful (*Addison*). 5. Civil and formal to a fault (*Sidney*).

CEREMO'NIOUSLY. *ad.* In a ceremonious manner; formally: respectfully (*Shak.*).

CEREMO'NIOUSNESS. *s.* Addictedness to ceremony; the use of too much ceremony.

CEREMONY, an assemblage of several actions, forms, and circumstances, serving to render a thing more magnificent and solemn. In 1646, M. Ponce published a history of ancient ceremonies, tracing the rise, growth, and introduction of each rite into the church, and its gradual advancement towards superstition. Many of them were borrowed from judaism; but more, seemingly, from paganism. Dr Middleton has given a fine discourse on the conformity between the pagan and popish ceremonies, which he exemplifies in the use of incense, holy water, lamps, and candles, before the shrines of saints, votive gifts or offerings round the shrines of the deceased, &c. In effect, the altars, the images, crosses, processions, miracles, and legends; nay, even the very hierarchy, pontificate, religious orders, &c. of the present Romans, he shows, are all copied from their heathen ancestors.

CEREMONIES (Master of the), an officer instituted by king James I., for the more honourable reception of ambassadors and strangers of quality. He wears about his neck a chain of gold, with a medal under the crown of Great Britain, having on one side an emblem of peace, with this motto, *Beati pacifici*; and on the other, an emblem of war, with *Dieu et mon droit*: his salary is 300l. per annum. He has an assistant, whose salary is 141l. 13s. and 4d. per annum: and under them both is a marshal of the ceremonies, having a salary of 100l. per annum.

CEREOSIS, (κερκωσις, from κερκος, a tail) A disease of the clitoris by which it becomes enlarged, and hangs from the vagina like a tail.

CERES, in mythology, the goddess of corn and of harvests, was daughter of Saturn and Vesta. She had a daughter by Jupiter, whom she called Pherephata, fruit bearing, and afterwards Proserpine. This daughter was carried away by Pluto, as she was gathering flowers in the plains near Enna. The rape of Proserpine was grievous to Ceres, her search after her toilsome and laborious, until the nymph Arethusa informed her that her daughter had been carried away by Pluto. As the grant of Proserpine's restoration was of no effect because she had eaten of pomegranate in the kingdom of Pluto; the grief of Ceres for the loss of her daughter was so great, that Jupiter granted Prosperine to pass six months with her mother, and the rest of the year with Pluto. To repair the loss which mankind had suffered by her absence, during her enquiries after Proserpine, the goddess went to Attica, which was become the most dissolute country in the world, and instructed Triptolemus of Eleusis in every thing which concerned agriculture. She taught him how to plough the ground, to sow and reap the corn, to make bread, and to take particular care of fruit trees. After these instructions, she gave him her chariot, and commanded him to travel all over the world, and communicate his knowledge of agriculture to the rude inhabitants, who hitherto lived upon acorns and the roots of the earth. (See TRIPTOLEMUS.) Her beneficence to mankind made Ceres respected, and Sicily was supposed to be the favourite retreat of the goddess, in the waters of the fountain, where the commemoration of the rape was celebrated about the beginning of the harvest, and the search of Ceres at the time that corn is sown in the earth. Attica, which had been so eminently distinguished by the goddess, gratefully remembered her favours in the celebration of the Eleusinian mysteries. (See ELEUSINIA.) Ceres also performed the duties of a legislator, and the Sicilians found the advantages of her salutary laws; hence, her sirname of Thesmophora. She is the same as the Isis of the Egyptians, and her worship, it is said, was first brought into Greece by Erechtheus. While the corn was yet in grass, they offered her a ram, after the victim had been led three times round the field. Ceres was represented with a garland of ears of corn on her head, holding in one hand a lighted torch, and in the other a poppy, which was sacred to her. She was supposed to be the same as Rhea, Tellus, Cybele, Bona Dea, Berecynthia, &c. The Romans paid her great adoration, and her festivals were yearly celebrated by the Roman matrons on the month of April, during eight days. Ceres is metaphorically called bread and corn, as the word Bacchus is sometimes used to signify wine. (*Apollod. Paus. Hesiod. &c.*)

The noble fragment of this goddess's statue, anciently worshipped in her renowned temple at Eleusis, was brought to England and placed in a proper situation in the Cambridge university library, through the skill and perseverance of Dr. E. Clarke of that university. The fragment is one piece of marble, seven feet high from the top of the calathus, which rests on the head, to the bottom, which terminates at the girdle a little below the breasts. The height of the calathus is about two feet; the head is one foot six inches; the calathus is ornamented with spikes of corn, the lothus, the latus, leaves of olive, and a vase. The features of the face are obliterated; the hair is collected in one large tress, which is tied and falls between the shoulders; her tunic is secured by a bandage, crossed between the breasts and buttoned with a Medusa's head; the zone a little lower terminates the fragment. This statue was the workmanship of Phidias.

CERES FERDINANDEA, the name given by M. Piazzi, of Palermo, to a planet which he discovered on the 1st of January 1801.

M. Piazzi, in a brief account he has published of the discovery of this planet, states that,

having been engaged for nine years in verifying the positions of the stars as collected in the catalogues of various astronomers, he was searching, on the 1st of January 1801, among many others, for the 87th in the catalogue of the zodiacal stars of the abbé De la Caille, when he observed that this star was preceded by another, which, according to his usual custom, he wished to observe also; especially as it did not interrupt the principal observation. Its light was somewhat faint, and its colour resembled that of Jupiter; but like many others which, in regard to their magnitude, are usually placed in the eighth class. At that time no doubt arose respecting the nature of it; but on the evening of the 2d, having repeated his observations, and finding that they did not correspond either in time or zenith distance, he suspected that some error had been committed in his observations on the preceding day. He then began to entertain some idea that it might perhaps be a new planet. In the evening of the 3d his conjecture was confirmed, and he assured himself it was not a fixed star. However, before he would speak of it, he waited till the evening of the 4th, on which he had the satisfaction of finding that it had moved according to the same laws which it had observed on the preceding days. At this time the motion was retrograde; but on the 10th of January it became direct. He continued to observe the planet till the 13th of February, when he was obliged by illness to discontinue his observations. M. Piazzi then transmitted accounts of his observations to several celebrated astronomers, in order that they might calculate the orbit of the new star, and trace out its progress in the heavens: but it eluded every search that was made for it, until December 7th, when it was re-discovered by the assiduous Dr. Zach, of Saxe-Gotha; and soon after it was observed by Dr. Olbers, at Bremen; by Mechain, at Paris; by the royal astronomer, at Greenwich; by Dr. Herschel, at Slough; and by various other persons both in England and Scotland.

Elements according to Burckhardt.

Inclination of orbit - -	$0^s\ 10^0\ 37'$
Node - -	2 21 6
Epoch of 1801 -	2 17 19
Aphelion - -	10 26 9
Passage of the aphelion January 1, 1801	- 8 hours
Eccentricity of orbit -	0·0791
Mean distance -	2·7677
Revolution -	4·606 years

Elements according to Gaüss.

Inclination of orbit - -	$0^s\ 10^0\ 36'\ 57''$
Node - -	2 21 0 44
Epoch of 1801 -	2 16 28 0
Mean anomaly -	3 15 55 0
Aphelion -	10 26 27 38
Eccentricity - -	0·0825017
Equation - -	$9^0\ 28'$
Distance - -	2·7355
Revolution - -	$1681^d\ 12^h\ 9^m$

These elements correspond perhaps, all circumstances considered, as nearly as ought to be expected; yet, it must be confessed that the elements according to M. Gaüss are not in due proportion to each other. See the article ASTRONOMY.

From the observations of Dr. Herschel, it is probable that the diameter of this planet is much less than that of the moon: it appeared under a disc of less than 2″. Yet small as is this planet, M. Shröeter suspects it has two satellites.

It has been expected for nearly a century that such a discovery as this of M. Piazzi would be made by some diligent astronomer. Maclaurin, Lambert, Bode, Zach, Lofft, and others have supported the conjecture. And six astronomers assembled at Lilienshal, in September 1800, resolved to establish a society of 24 practical astronomers dispersed throughout different parts of Europe, for the express purpose of searching out this planet between Mars and Jupiter: they elected Shröeter as their president, and Dr. Zach was chosen their secretary. See Phil. Mag. Nos. 45 and 46; Nich. Journal, N. S. Nos. 3 and 4; and O. Gregory's Astron. p. 242.

CERET, a town of France, in the department of the Eastern Pyrenees, with a magnificent bridge of one arch over the Tet. Lat. 42. 36 N. Lon. 2. 46 E.

CERIA, in entomology. See MUSCA.

CERIGNOLA, a town of Naples, in Capitanata, celebrated by Horace for its excellent bread. Near this town are the ruins of the ancient Salope, still called Salpe.

CERIGO, an island in the Archipelago, anciently called Cytherea, noted for being the birthplace of Helen, and, as the poets say, of Venus. It is 45 miles about; very mountainous, and its soil dry. Lat. 36. 20 N. Lon. 23. 22 E.

CERINTHE. Honey-wort. In botany, a genus of the class pentandria, order monogynia. Corol with a tubular swelling border; the throat pervious; seeds two, two-celled. Three species; Austria, Italy, and Siberia. Low annual plants, with purple, yellow, and red flowers, usually propagated by seeds sown in the autumn in warm borders.

CERINTHIANS, a sect that took their name from Cerinthus, cotemporary with St. John; who formed a singular system of doctrine and discipline, by combining the doctrines of Christ with the opinions and errors of the Jews and Gnostics.

Cerinthus ascribed the creation of the world and the legislature of the Jews to a created being, who derived from the Supreme God extraordinary virtues and powers, but afterwards became apostate and degraded. He supposed that Jesus was a mere man, born of Joseph and Mary; but that, in his baptism, Christ, who was one of the Æons, descended upon him in the form of a dove; and that he was commissioned to oppose the degenerate god of the Jews, and to destroy his empire. In consequence of which, by his instigation, the man

Jesus was seized and crucified; but Christ ascended up on high, without suffering at all. He recommended to his followers the worship of the Supreme God in conjunction with his son; he required them to abandon the lawgiver of the Jews; and, though they were permitted to retain a part of the Mosaic law, yet they were to make the precepts of Christ the rule of their conduct. For their encouragement, he promised them the resurrection of the body; after which the millennium was to commence, under the government of Christ united to the man Jesus: and this he represented as consisting in eating and drinking, nuptial entertainments, and other festivities.

Some authors ascribe the book of the Apocalypse to Cerinthus; adding, that he put it off under the name of St. John, the better to authorise his reveries touching Christ's reign in the flesh: but it is justly observed by the bishop of London, in his third Pastoral Letter, p. 58, that his millenary state was not the life of saints, as the Apocalypse represents it, but the life of libertines: and it is even certain he published some works of this kind, under the title of Apocalypse. The Corinthians received the gospel of St. Matthew, to countenance their doctrine of circumcision, from Christ's being circumcised; but they omitted the genealogy. And they discarded the epistles of St. Paul, because that apostle held circumcision abolished. See farther Mosheim's Eccles. Hist. vol. i.; Lardner's Works, vol. ii.

CERINTHUS. See CERINTHIANS.

CERITE. See MUREX.

CERIUS and RHETIUS, charioteers of Castor and Pollux.

CERNE, or CERNE ABBAS, or CERNE ABBEY, a town of England, in the county of Dorset, so called from an abbey, of which only the porter's lodge remains: this town has long been celebrated for its strong beer. It has a market on Wednesdays: on the north side of the town, on a chalky hill, is the figure of a giant, said to represent Cenric, son of Cuthred, king of Wessex, who was killed in the year 748: eight miles N. Dorchester, and 121 W. London.

CERNOUS, (*cernuus*; *qui terram cernat*). In botany, applied to the flower or peduncle. It is almost synonymous with drooping, but differs from nutans or nodding.

CEROCOMA. In the Fabrician system of entomology, a tribe or family of the order coleoptera, genus LYTHA, which see.

CEROMA, (κηρωμα, from κηρος, wax.) In medicine. Cerate or salve composed of wax.

CEROMA, in antiquity, denotes, 1. A mixture of oil and wax with which the wrestlers rubbed themselves. 2. A cere cloth.

CEROPEGIA. In botany, a genus of the class pentandria, order digynia. Corol twisted, with the border connivent; follicles two, erect; seeds downy. Ten species; natives of the Cape, or East Indies.

CEROSTROTUM, in antiquity, a kind of mosaic pavement inlaid with coloured horns.

CEROTUM. The same as ceroma.

CE'RTAIN. *a.* (*certus*, Latin.) 1. Sure; indubitable; unquestionable (*Tillotson*). 2. Resolved; determined (*Milton*). 3. Undoubting; put past doubt (*Dryden*). 4. Unfailing (*Mead*). 5. Constant; not casual (*Dryden*). 6. Regular; settled; stated (*Pope*). 7. In an indefinite sense, some: as, a *certain* man told me this (*Wilkins*).

CE'RTAINLY. *ad.* (from *certain.*) 1. Indubitably; without question (*Locke*). 2. Without fail

CE'RTAINTY. *s.* (from *certain.*) 1. Exemption from doubt (*Locke*). 2. Exemption from failure. 3. That which is real and fixed (*Shakspeare*). 4. Regularity; settled state.

CE'RTES. *ad.* (*certes*, French.) Certainly; in truth (*Hudibras*).

CERTHIA. Creeper or ox-eye. In zoology, a genus of the class aves, order picæ. Bill arched, slender, somewhat triangular, pointed; tongue various, generally pointed; feet formed for walking. This is a tribe dispersed through most countries of the globe: they feed chiefly on insects, in search of which they creep up and down trees: breed in hollow trees, and lay numerous eggs: nostrils small; tail-feathers twelve; legs large; hind-toe stout; claws long, hooked; tongue mostly sharp, but sometimes flat at the tip, fringed or tubular. Seventy-seven species: of these the two following are chiefly entitled to notice.

1. C. familiaris. Common creeper. Grey, beneath white; quill-feathers brown; ten of them with a white spot. Head and neck brown with black streaks; rump tawny; wing-coverts varied brown and black; breast and belly silvery; tail long, tawny, the feathers sloping off to a point. There is a variety, but differing only in possessing a larger size. Runs with wonderful facility above or under the branches of trees on the sight of persons below, and with such a rapidity as to give the appearance of several birds on the same tree at the same time.

2. C. sannis. Mocking creeper. Olive, crown inclining to a violet; spot on the cheeks white; wings and subforked tail brown. Inhabits New Zealand; seven and a quarter inches long; sips the moisture from the nectary of flowers; imitates the note and voice of other birds with surprising accuracy, whence its name. See Nat. Hist. Plate VIII.

CER'TIFICATE. *s.* (*certificat*, low Lat.) 1. A writing made in any court, to give notice to another court of any thing done therein (*Cowell*). 2. Any testimony (*Addison*).

CERTIFICATE (Trial by), in the law of England, a species of trial allowed in those cases where the evidence of the person certifying is the only criterion of the point in dispute. For when the fact in question lies out of the cognizance of the court, the judges must rely on the solemn averment or information of persons in such a station as affords them the most clear and competent knowledge of the truth. As therefore such evidence, if given to a jury, must have been conclusive, the law, to save

trouble and circuity, permits the fact to be determined upon such certificate merely.

To CE'RTIFY. *v. a.* (*certifier*, French.) To give certain information of (*Hammond*).

CERTIORARI, in law, a writ which issues out of the chancery, directed to an inferior court, to call up the records of a cause there depending, in order that justice may be done. And this writ is obtained upon complaint, that the party who seeks it has received hard usage or is not likely to have an impartial trial in the inferior court. A certiorari is made returnable either in the king's bench, common pleas, or in chancery. It is not only issued out of the court of chancery, but likewise out of the king's bench; in which last mentioned court it lies where the king would be certified of a record. Indictments from inferior courts, and proceedings of the quarter-sessions of the peace, may also be removed into the king's bench by a certiorari: and here the very record must be returned, and not a transcript of it; though usually in chancery, if a certiorari be returnable there it removes only the tenor of the record.

CERTITUDE, is properly a quality of the judgment, importing an adhesion of the mind to the proposition we affirm, or the strength wherewith we adhere to it.

Certitude is of the same nature with the evidence that produces it: the evidence is in the things that the mind sees and considers, i.e. in the ideas; certitude is in the judgment the mind makes of those ideas.

The schoolmen distinguish two kinds of certitude: the one of speculation, arising from the evidence of the thing; the other of adhesion, which arises from the importance thereof: this last they apply to matters of faith.

Further, the schools distinguish three other kinds of certitude, which regard the three different kinds of evidence whence they arise.

CERTITUDE (Metaphysical), is that arising from a metaphysical evidence: such is that a geometrician has of the truth of this proposition, "that the three angles of a triangle are equal to two right ones."

CERTITUDE (Physical), is that arising from physical evidence: such is that a man has, that there is fire on his hand, when he sees it blaze, and feels it burn.

CERTITUDE (Moral), is that founded on moral evidence: such is that a person has, that he has got, or lost a cause, when his attorney and friends send him an express notice of it, or a copy of the judgment, &c.

Moral certitude is frequently equivalent to metaphysical certitude. Thus a criminal who hears the sentence read, frequently makes no doubt either of his condemnation or execution; and yet has nothing, here, beyond a moral certitude; for metaphysical certitude he has none; neither has he any physical certitude, except as to what relates to the reading of the sentence, and the action of the executioner, when he takes him into his possession.

CERTOSA, a celebrated Carthusian monastery, in the duchy of Milan, 4 miles from Pavia. Its park is surrounded by a wall 20 miles in circuit, and contains several villages.

CERVANTES. See SAAVEDRA.

CERVELET, in music, a very short kind of bassoon formerly much in use.

CERVETTO (Giovanni Paoli), a painter of Genoa, who was the disciple and successful imitator of Valerio Castelli. He died in 1767.

CERVETTO, an Italian musician, who came to England about 1740, being then an old man; and was engaged at the theatre in Drury-lane to play the bass. He died in 1783, aged 103. The following anecdote of this performer and Mr. Garrick is a good proof of the obsequiousness of the one, and the vanity of the other. One night when the whole house was in profound silence during one of Garrick's solemn pauses, poor Cervetto, being half asleep, stretched wide his jaws, and uttered a loud yawn, which set the audience in a roar of laughter. This was very mortifying to our Roscius, who, at the close of the performance, attacked the musician with the greatest violence in the green-room. "Oh, Mr. Garrick!" cried the humble scraper, "I beg ten tousand pardons—but it is alvay the vay ven I be ver much pleased." The flattery disarmed Garrick of his rage at once. (*Watkins.*)

CERVICAL, (*cervicalis*; from *cervix*, the neck). Belonging to the neck; as cervical nerves, cervical muscles, &c.

CERVICAL ARTERIES. Arteriæ cervicales. Branches of the subclavians. See ANATOMY.

CERVIX, (*cervix*). The hinder part of the neck.

CERU'LEAN. CERULEOUS. *a.* (*cæruleus*, Lat.) Blue; skycoloured (*Boyle*).

CERULI'FICK. *a.* (from *ceruleous*.) Having the power to produce a blue colour (*Grew*).

CERUMEN, (dim. of *cera*, wax). The waxy secretion of the ears, situated in the meatus auditorius externus.

CERUSSA, (*cerussa*, κηροεσσα, from κηρος, wax, or from *razaz*, Arab.). Ceruse. White lead. This preparation is the acetous oxyd of lead in the new chemical nomenclature, oxydum plumbi album acetatum. This substance is obtained by the oxydation of the metal by means of the acetic acid applied in the form of vapours or fumes of vinegar, and then dissolving the oxyd in carbonic acid. This article is principally made in Great Britain and Holland; and the general process employed in its manufacture is as follows.—The lead is melted by means of a gentle heat, and poured into iron moulds 2 feet in height by 4 or 6 inches in width; in some houses they cool the lead by dipping it in water, while in others this is not practised; they only take care that it be not poured into the moulds too hot, as in that state it is apt to adhere to their surface. In proportion as the lead diminishes in the caldron they put into it a fresh supply. The leader plates one of different degrees of thickness, varying from one twelfth to one twenty-fourth of an inch. The pots intended to receive these plates are from 7 to 8 inches in height, and from 2 to 3 inches in diameter: they are com-

posed of earth varnished within, and are widest at the top. At one third of their height are three projecting points in the middle, intended to support the leaden plates. The apartment in which the operation is performed is frequently open towards one of its sides, and is divided into different compartments by means of pillars, which support strong platforms intended to contain the beds in which the pots are placed. Upon a bed formed in each compartment with straw, which has served as litter, and which is raised to about the height of three feet, and well trodden down, are disposed a range of pots, without stuffing the empty spaces with the dung. The pots are then filled with vinegar to the height of about two inches, so as to reach the projecting points already mentioned; after which a very thin plate of lead is introduced into each of them, rolled up in a spiral form, and supported on these projections. The pots are afterwards covered with plates of lead, somewhat thicker than the former. Upon this first stratum of dung is raised a second, of about one foot in thickness, which is also trodden down with care in order to render it more compact; other pots are likewise arranged on this bed, and from five to seven beds are raised in the same manner, their sides and tops being covered so that each range of pots is surrounded with about one foot of dung. The beds are of such a size that each can receive six or eight hundred pots. They are always placed against the pillars of the wooden platforms in order to support the bed in proportion as it is raised, and the same precaution is used in taking them down again. When the fermentation appears to languish, the beds are watered with the urine of horses, and the openings into the apartments closed up. The pots are left in the beds during a month or six weeks. At first the mass swells up from the great extrication of carbonic acid gas: the fermentation in a short time, however, is moderated, and remains stationary; the average heat in the mass is about 40 degrees of Reaumur, or 122° of Fahrenheit. After taking the beds to pieces, the plates are transferred to solid tables, where the white stratum formed on the surfaces of the lead is detached by striking them above with a hammer; care being taken to moisten the plates with water, in order that the oxyd may not be raised in powder. The leaden plates with which the pots were covered exhibit a more hard and compact crust. (*Chaptal.*) The substance thus produced is what is called the white-lead, which when further prepared by washing and grinding, is termed ceruse. The grinding is performed in the wet state, almost as snuff is ground in the dry, by a large horizontal wheel, whose power is derived either from horses, steam, wind, or water, with cogs turning from 8 to 16 or more pestle-shaped pieces of metal which revolve in mortars in which the ceruse is put. After levigation, it is dried by a stove with pans, or by other means, and is then ready for sale. Some manufacturers have a pair of horizontal stones like those of the flour-mills, for the purpose of grinding it in oil. In the manufacture of ceruse, it is frequently adulterated with whiting; and in most cases a little lamp-black is added, to give it that grey tint which is more agreeable to the eye.

M. Van Mons states, that if lead ashes be dissolved in a sufficient quantity of dilute nitric acid, assisted by a gentle heat, and the solution be filtered, and then precipitated by chalk brought to an impalpable powder by levigation, the precipitate, when washed and dried, will be the purest and most beautiful ceruse possible.

Mr. Richard Fishwick, of Newcastle upon Tyne, has obtained a patent to secure to himself the advantage of substituting exhausted tanner's bark in the room of horse-litter, or mixing a proportion of one with the other.

It has been attempted to substitute the heat of a furnace for that of dung, particularly in the north of Europe; but though this method possesses the advantage of producing no exhalation which can alter the colour of the oxyd, it is yet probable that, on the whole, a moist heat is preferable to a dry one.

M. Chaptal affirms that he has practised the following method on a large scale for several years. One hundred parts of muriat of soda (common salt) are dissolved in four times that quantity of cold water; with this solution, or part of it, as may be required, are mixed and kneaded 400 parts of pounded litharge (semi-vitreous oxyd of lead), and the soft paste thus formed is left for some time in a state of repose; the mixture is then shaken almost incessantly, and the remainder of the solution of muriat is added in proportion as it thickens, and for want of that some pure water. The mixture whitens, and swells up, and the litharge disappears; at the end of 24 hours boiling water is poured upon it, to extract the soda; and is then evaporated to obtain the alkali. The muriat of lead which is formed assumes a beautiful yellow colour by calcination and melting, and is very useful in the arts. If a little sulphuric acid, very much diluted, is poured upon this muriat, the sulphate which is formed assumes in a moment the colour of a very agreeable white, and becomes of extreme fineness. It may then be washed and pounded, or moulded into loaves for sale. This sulphate may be improved by decomposition with potash or soda, which produces a white oxyd, pure and very heavy, differing very little from the best white lead of the shops. Application of Chem. to the Arts, IV. 317—19.

Ceruse is much used by the painters, both in oil and water-colours; and no substance has yet been discovered which is so well adapted to this purpose whether for internal or external use. The discovery of some other white for an oil-colour is desirable, on account of the injury which the workmen employed in the manufacture and the use of ceruse sustain from its deleterious exhalations, which, in common with other preparations of lead, produce that dreadful disease which is known as the colic of minerals, or of painters. See Colic.

To guard, at least in some measure, against

NATURAL HISTORY.

PL. LXXI.

Cervus Alces, or Elk.

Drawn from Life by S. Edwards.

Dasypus Tricinctus, or Three banded Armadillo.

London, Publish'd by G. Kearsley, Fleet Street, July 2.1808.

these pernicious effects, it has been recommended that the colours should never be ground, but in spacious apartments, and never in a dry state; that the face be covered with a mask; and that the operator place himself in a current of air which may carry off the vapours as they rise. M. Chaptal and others have observed that the odour of vinegar speedily corrects the pernicious effects of these exhalations, by combining with, and precipitating them.

Lord Dundonald invented an easy method of preparing ceruse, in which he directs common lead to be reduced to a calx, but not too fine, and to have a proportion of five-sixth parts thereof, intimately mixed with muriat, or solution of potass. In this state he directs it to be frequently stirred, in order to have the new surfaces of the mixture exposed to the carbonic acid of atmospheric air; as his lordship observes, that the effects of the carbonic acid on the alkali existing in the present state of the mixture is essentially necessary, in order to effect the intended purpose. In this state it is to be frequently sprinkled with water; and, after the calx has been long enough immersed with the muriate to be sufficiently operated upon, the muriate is to be levigated by common water from the calx, and to be concentrated by evaporation, in order to be made use of at a future period with other calx. The calx is to be afterwards ground, levigated, and dried for use.

For this discovery his lordship obtained a patent on the 8th of August 1797; and the success which has attended the former patents of this scientific nobleman leads us to conclude, that the present discovery is entitled to the attention of the public.

Ceruse is sometimes employed medicinally, in form of powder and ointment, to children whose skin is fretted. It should, however, be used cautiously, as there is great reason to believe that complaints of the bowels of children originate from its absorption.

Cerussa acetata. Saccharum saturni. Sugar of lead. This is an acetite of lead, and therefore called *acetis plumbi* in the new chemical nomenclature. It possesses adstringent and sedative powers, and is given internally, in very small doses, in hæmorrhagic complaints. Great attention should be paid to keeping the bowels open during its exhibition, for it otherwise produces the colica pictonum. Externally, it is employed as a powerful resolvent in inflammatory affections.

CERVUS. Deer. In zoology, a genus of the class mammalia, order pecora. Horns solid, branched, annual; tip thicker, and covered with a downy skin; fore-teeth, lower eight; tuskless, or upper tusk solitary. The animals of this kind live in woods; fight with the horns; stamp with the fore-feet; and have no gall-bladder; flesh tender and wholesome. Eleven species.

1. C. pigargus. Tailless roe. Tailless: horns three-forked; body deep-red beneath, and on the limbs paler; round the nose and on the sides of the upper lip black; tip of the lip and rump white; horns tuberculate at the base; ears within white, hairy. Inhabits the woody mountains of Hercania, Russia, and Siberia; becomes hoary in winter, and descends into the plains; larger than the common roe.

2. C. alces. Moose. Elk. Horns palmate with short beams, or beamless; throat carunculate; ears long, large, upright, slouching; upper lip broad square, deeply-furrowed, hanging over the mouth; nose broad, nostrils large; neck short, slouching, with an upright mane: tail very short, spurious hoofs large, loose, making a rattling noise in travelling. Inhabits Europe, America, and Asia, as far as Japan; size of a horse: gentle except when teased by the gad-fly; feeds on twigs and branches of trees and marsh-plants; goes on its hoofs with a shambling gait at the rate of fifty miles a day; skin hard, almost able to resist a musket ball; flesh good; greatest height seventeen hands, greatest weight twelve hundred and thirty pounds. The horns have occasionally measured thirty-two inches in length: the female somewhat smaller. Another variety with palmate horns, beams long; anthers flattened; palm-snags long; one on the inner edge of each palm. The animal no longer known to be in existence; but the horns frequently dug out of the peat-bogs in Ireland; larger than those of the common elk. See Nat. Hist. Pl. LXXI.

3. C. elephus. Stag. Of this species several varieties.

α. Horns branched, round, recurvate.

β. Larger; hair on the neck longer.

γ. Less; body brown.

δ. Horns very ample.

ε. Size of a common dog; inhabits China.

In all body above tawny-brown, beneath whitish, rarely all white; fawn spotted with white; the lachrymal duct very distinct; branches increasing in number every year. Inhabits Europe, North America, and Asia, in herds of many females, with their young under the guidance of one male; swims well; gentle, except during the season of the gad-fly; fights furiously for the females, which are seldom horned; female gravid eight months; brings one, rarely two young; drops its horns in February or March, and recovers them fully by July; of elegant shape, three feet and half high.

4. C. tarandus. Rein-deer. Of this also there are several varieties.

α. Horns branched, round, recurvate, summits palmate.

β. Horns entirely round, covered with a hairy skin.

γ. Horns straight, with one branch at the base turned back.

In all of them body brown above, gradually growing whiter with age; mouth and body below white; tail white, hair thick, under the neck long; six six, the two hinder spurious tamed; of exquisite smell; flesh good when salted; size of c. dama.

δ. C. porcinus. Porcine deer. Horns slender, three-forked; body above brown; beneath, cinereous. Inhabits India; three feet and half

long, two and half high; horns thirteen inches long; tail eight; body thickish, and feet slender. There is another variety found at the Cape. Body yellowish with white spots.

9. C. Mexicanus. Mexican deer. Horns three-forked at the tip, turned forward; body tawny: when young spotted with white; head large; eyes large, bright; flesh inferior to venison. Inhabits New Spain, Guinea, and Brasil.

10. C. capreolus. Roe. Horns branched round, erect; summits bifid; body brown-tawny. Hair soft, in summer smooth; above, tawny with grey tips; beneath, white: in winter longer, hoary, blackish on the back; face blackish; horns from six to eight inches long; legs slender; tail an inch long. There is another variety, with body white; hoofs and nose black. Inhabits the less mountainous woods of Europe and Asia in small troops; active; drops its horns in autumn, recovers them in winter; never grows fat; flesh very delicate; gravid from twenty to twenty-two weeks; brings twins; female without horns; feeds on shoots of fir and beech: two and a half feet high.

11. C. muntjac. Rib-faced deer. Three longitudinal ribs from the horns to the eyes; upper tusk projecting. Inhabits in small tribes Java and Ceylon; less than the roe; horns placed on a bony process which is covered with hair, three-forked; uppermost branch hooked; flesh good.

CERYX, in antiquity, a sort of public criers appointed to proclaim or publish things aloud in public assemblies. The ceryx among the Greeks answered to the præco among the Romans. There were two kinds of ceryces, civil, and sacred. The former were those appointed to call assemblies, and make silence therein; also to go on messages, and do the office of our heralds, &c. The sacred ceryces were a sort of priests, whose office was to proclaim silence in the public games and sacrifices, publish the names of the conquerors, proclaim feasts, and the like.

CESARE, among logicians, one of the modes of the second figure of syllogisms; the minor proposition of which is an universal affirmative, and the other two universal negatives: thus,

CE No immoral books ought to be read;
SA But every obscene book is immoral;
RE Therefore no obscene books ought to be read.

CESPEDES (Paul), a Spanish painter of the 16th century. His picture of the last supper, in the cathedal of Cordova, is greatly admired. He is also spoken of as a man of letters as well as an artist. He died in 1608, aged above 70.

CESPITOUS. (*cespes*, turf.) In botany. Cum multi caules ex eadem radice prodeunt.—A cespitose or turfy plant, has many stems from the same root, usually forming a close thick carpet, or matted together.

CESS. *s.* (from *cense.*) 1. A levy made upon the inhabitants of a place, rated according to their property (*Spen.*). 2. The act of laying rates. 3. Bounds or limits (*Shaksp.*).

To CESS. *v. a.* To rate; to lay charge on. (*Spen.*).

CESSA'TION. *s.* (*cessatio*, Latin.) 1. A stop; a rest (*Hayward*). 2. Vacation; suspension (*Addison*). 3. End of action (*Arbuthnot*). 4. A pause of hostility, without peace (*K. Ch.*).

CESSA'VIT. *s.* (Latin.) A writ that lies upon this general ground, that the person against whom it is brought hath, for two years, omitted to perform such services as he is obliged by his tenure (*Cowell*).

CESSIBI'LITY. *s.* (from *cedo*, *cessum*, Latin.) The quality of receding, or giving way (*Digby*).

CE'SSIBLE. *a.* (*cessum*, Latin.) Easy to give way (*Digby*).

CE'SSION. *s.* (*cession*, Fr.) 1. Retreat; the act of giving way (*Bacon*). 2. Resignation; the act of yielding up (*Tem.*).

CESSION, in law, an act by which a person surrenders and transmits to another person a right which belonged to himself. Cession is more particularly used in the civil law for a voluntary surrender of a person's effects to his creditors, to avoid imprisonment.

CESSION, in the ecclesiastical law, is when an ecclesiastical person is created a bishop, or when a parson of a parish takes another benefice without dispensation, or being otherwise qualified. In both these cases their first benefices become void by cession, without any resignation; and to those livings that the person had, who was created bishop, the king may present for that time, whosoever was patron of them; and in the other case the patron may present; but by dispensation of retainder, a bishop may retain some or all the preferments he was entitled to, before he was made bishop.

CE'SSIONARY. *a.* (from *cession.*) Implying a resignation.

CE'SSMENT. *s.* (from *cess.*) An assessment or tax.

CE'SSOR. *s.* (from *cesso*, Lat.) He that ceases or neglects so long to perform a duty, that he incurs the danger of law (*Cowell*).

CESTRUM. Bastard jasmin. In botany, a genus of the class pentandria, order monogynia. Corol funnel-form; stamens with a small tooth in the middle; berry one-celled, many-seeded. Eleven species; West Indies and South America; flowering shrubs rising in height from five to twelve feet, with white or pale yellow corols. All require much care, and a high artificial heat; and for the most part may be propagated by cuttings or seeds.

CESTUI, a French word, signifying he or him, frequently used in our law-writings. Thus cestui qui trust, a person who has lands, &c. committed to him for the benefit of another; and if such person does not perform his trust, he is compellable to it in chancery. Cestui qui vie, one for whose life any lands, &c. are granted. Cestui qui use, a person to whose use any one is infeoffed of lands or tenements. Formerly the feoffees to uses were deemed owners

of the land, but now the possession is adjudged in cestui qui use.

CESTUS, among ancient poets, a fine embroidered girdle worn by Venus, endowed with a faculty of charming, and conciliating love.

The word is also written cestum, and ceston: it comes from κεϛος, a girdle, or other thing embroidered, or wrought with a needle; derived, according to Servius, from κεντειν, pungere: whence also incestus; a term used at first for any indecency by undoing the girdle, &c. but now restrained to that between persons near akin. See INCEST.

Homer gives a description of the mystic effects of this cestus, which we here subjoin in the words of his translator Pope:

> In it was every art, and ev'ry charm,
> To win the wisest, and the coldest warm:
> Fond love, the gentle vow, the gay desire,
> The kind deceit, the still-reviving fire,
> Persuasive speech, and more persuasive sighs,
> Silence that spoke, and eloquence of eyes.

This fiction, which is extremely beautiful, has been happily imitated by Tasso, in his magic cincture of Armida.

CETA'CEOUS. *a.* (from *cete*, Lat.) Of the whale kind (*Brown. Ray*).

CETE, in zoology, the seventh order of the class mammalia, including the monodon, balæna, physeter, and delphinus. The following in the ordinal character: fins pectoral, instead of feet; tail horizontal, flattened; clawless; teeth in some cartilaginous, in some bony; nostrilless; instead of which is a fistulous opening in the anterior and upper part of the head; food molluscæ and fishes; habitation the ocean. Notwithstanding the resemblance of the habits and manners of this order to those of fishes, and the repugnance of the vulgar at believing whales and dolphins, &c. can be otherwise than fishes, they are necessarily arranged with man and quadrupeds, in the class mammalia, from their similarity of physical structure; the heart having two auricles and two ventricles; the blood being warm; lungs respiring alternately; eye-lids moveable; ears hollow, receiving sound through the medium of the air; vertebræ of the neck seven; lumbar bones and coccyx; teats lactiferous, with which they suckle their young.

CETERACH, in botany. (Blanchard says this word is corrupted from *pteryga*, πτηρυξ, as *peteryga*, *ceteryga*, and *ceterach*.) Scolopendria vera. Spleenwort. Miltwaste. This small bushy plant, asplenium ceterach, frondibus pinnatifidis, lobis alternis confluentibus obtusis, of Linnéus, grows upon old walls and rocks. It has an herbaceous, mucilaginous, roughish taste, and is recommended as a pectoral. In Spain it is given, with great success, in nephritic and calculous diseases. See ASPLENIUM.

CETHEGUS. The most remarkable of this name among the Romans are the two following: a tribune at Rome, of the most corrupted morals, who joined Catiline in his conspiracy against the state, and was commissioned to murder Cicero. He was apprehended, and, with Lentulus, put to death by the Roman senate. (*Plut.*)—P. Corn. a powerful Roman, who embraced the party of Marius against Sylla. His mistress had obtained such an ascendancy over him, that she distributed his favours, and Lucullus was not ashamed to court her smiles, when he wished to be appointed general against Mithridates.

CET'ONIA. In the Fabrician system of entomology, a tribe belonging to the class coleoptera, genus scarabæus. See SCARABÆUS.

CETRA, a small leathern shield used by the ancient Spaniards, Moors, and even Britons.

CETUS, in astronomy, the whale, an old southern constellation, under Pisces. It consists of 93 stars of the first six magnitudes, viz. 0. 2. 8. 13. 10. 60. In the neck of Cetus is a remarkable star which grows brighter and fainter alternately, owing, as is supposed, to its rotation on its axis; the period of its changes is about 312 days.

CEVADILLA (*cevadilla*, dim. of *ceveda*, barley, Spanish.) Cevadilla hispanorum. Sevadilla. Sabadilla. Hordeum causticum. Indian caustic barley. The plant whose seeds are thus denominated is a species of veratrum: they are powerfully caustic, and are administered with very great success as a vermifuge.

CEVENNES, mountains of Languedoc, in France, remarkable for the frequent meetings of the protestants, as a place of security against the tyranny of their governors. In the reign of queen Anne, an attempt was made to assist them by an English fleet in the Mediterranean; but the expedition failed, because the French had occupied the passages.

CEUTA, a seaport town of Africa, on the south coast of the Mediterranean, in the kingdom of Fez, belonging to Spain, with a good harbour for small vessels, the see of a bishop, suffragan of Lisbon. This town was taken from the Moors in the year 1409, by John, king of Portugal, and continued annexed to that crown till the revolution in the year 1640, when it fell to Spain, and was finally ceded to that country by the treaty of Lisbon, in the year 1688. It withstood a vigorous siege against the Moors in 1697: it is situated in the narrowest part of the Mediterranean, not above five leagues from Gibraltar. Lat. 35. 48 N. Lon. 5. 25 W.

CEYENNE PEPPER. See PIPER INDICUM.

CEYLON, or, THE CINNAMON ISLE, the *Taprobana* of the ancients, a large island of the East Indies, which lies on the S. E. of the Coromandel coast, from which it is separated by Ramanakoiel. It is situated between six and ten degrees of N. lat. and between 78 and 82 degrees of E. lon. The chief towns are Candy, Columbo, and Ramanakoiel. The island is about 250 miles long, and 200 broad. It is mountainous and woody in the middle; but the coast is very flat, and well planted with groves of cinnamon trees and cocoas; and no

country abounds more with elephants. The Dutch have subdued all the coasts, and shut up the king in his capital city, Candy, which stands upon a mountain in the middle of the island; neither the king nor his subjects being permitted to traffic, or to entertain any correspondence with other nations. The capital of the Dutch settlements is the port of Columbo, situated on the S. W. coast of the island. The descendants of the ancient inhabitants, of whom the bulk of the people still consists, are called Cinglasses. There are also great numbers of Moors, Malabars, Portuguese, and Dutch, upon the island. The tree peculiar to this island, and more valuable to the Dutch than the mines of Potosi are to the Spaniards, is the cinnamon. This tree is as common as any other in the woods on the S. W. part of the island, near Columbo; but there are few or none of them to be found near the N. part. (See CINNAMON.) The Portuguese were the first Europeans who settled on this island; but the Dutch soon drove them away, and established themselves on all the principal places along the coast. In February, 1796, all the Dutch forts and settlements surrendered to the English; and, according to the preliminary treaty of peace, signed in the autumn of 1801, these are all to be retained. See Percival's Ceylon, Cordiner's Ceylon, and Asiatic Researches, vol. vi.

CEYLANITE. See SOPORLUS.

CHAA, in botany. See THEA.

CHABLAIS, a town of France, in the department of Yonne, and late province of Champagne. It is famous for white wines. Lat. 47. 42 N. Lon. 3. 59 E.

CHABOT, in ichthyology. See COTTUS.

CHACARILLÆ CORTEX. See CASCARILLA.

CHACE. See CHASE.

CHACKTOOLE BAY, an excellent bay in Norton Sound, which was discovered by captain Cook in 1778. Lat. 64. 31 N. Lon. 162. 47 W.

CHACONE, a musical air, much resembling the saraband.

CHADCHOD, in Jewish antiquity. Ezekiel mentions chadchod among the several merchandizes which were brought to Tyre. The old interpreters, not very well knowing the meaning of this term, continued it in their translation. St. Jerom acknowledges that he could not discover the interpretation of it. The Chaldee interprets it pearls; others think that the onyx, ruby, carbuncle, crystal, or diamond, is meant by it.

CHÆREFOLIUM. See CEREFOLIUM.

CHÆROPHYLLUM, (*chærophyllum*, χαιροφυλλον; from χαιρω, to rejoice, and φυλλον, a leaf; so called from the abundance of its leaves.) Chervil. Cow-parsley. In botany, a genus of the class pentandria, order digynia. Fruit oblong, almost smooth; petals heart-shaped, inflected; partial involucres reflected, concave. Eleven species, almost all of them natives of Europe, and the two following common to our hedges:

1. C. sylvestre: stem striate, smooth; joints rather tumid.

2. C. temulentus: stem rough with tumid joints.

The first is also denominated cientaria or bastard hemlock; and forms an article in the materia medica of various dispensatories, but is unentitled to the smallest notice as a medicine of any kind.

CHÆTIA, in zoology. See GORDIUS AQUATICUS.

CHÆTODON. In zoology, a genus of the class pisces, order thoracica. Head small; mouth small; the lips retractile; teeth (mostly) setaceous, flexile, moveable, equal, closely set, and very numerous; eyes round, small, vertical, furnished with a nictitant membrane; gill membrane from three to six-rayed; body broad, compressed, scaly, generally fasciated; dorsal and anal fins rigid, fleshy, coated with scales, and mostly spinous. Sixty-eight species. Inhabitants of the American or Indian seas, or fresh waters; many of them exhibiting a beautiful display of colours; and the flesh of most of them good, and of some delicious. The form of the greater number of the species is ovate, with a deep, compressed body; but of some of them, and especially c. orbicularis, and imperialis, nearly round, and resembling a flat fish. The species chiefly worth selecting is c. rostratus, or shooting chætodon, which inhabits the fresh waters of India, and is celebrated for the extraordinary manner in which it obtains possession of the flying insects that chiefly constitute its food. When it observes one of these either hovering over the water, or seated on some aquatic plant, it shoots against it, from its tubular snout, a drop of water with so sure an aim, as generally to lay it either dead or stupified on the surface of the stream. In shooting at a sitting insect it is commonly observed to approach within the distance of from four to six feet, before it elances its water. When confined in a large vessel of water, it is said to afford much diversion by its dexterity in this exercise; since if a fly or other insect be fastened to the edge of the vessel, the fish immediately perceives it, and shoots at it with admirable success The same faculty is said to appertain to various other species of this genus as well as c. rostratus: though the last appears to possess it in a pre-eminent degree. The specific character is tail entire; dorsal-spines nine: the fin with a black ocellate spot: snout cylindrical; body white with brown longitudinal lines and five transverse bars, the hinder ones edged with white. See Nat. Hist. Pl. L.

To CHAFE. *v. a.* (*echauffer*, French.) 1. To warm with rubbing (*Sidney*). 2. To heat by rage or fury (*Shakspeare*). 3. To perfume (*Suckling*). 4. To make angry (*Knolles*).

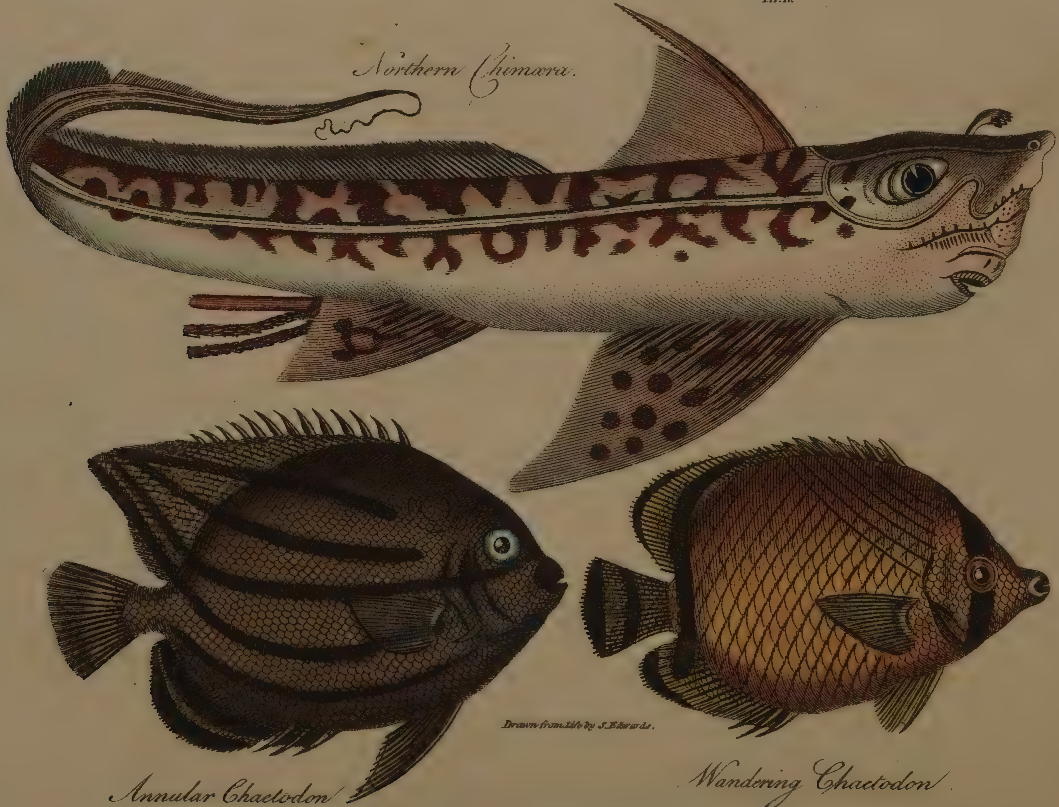
To CHAFE. *v. n.* 1. To rage; to fret; to fume (*Pope*). 2. To fret against any thing (*Sh.*).

CHAFE. *s.* (from the verb.) A heat; a rage; a fury; a passion; a fume (*Hudibras*).

CHAFE-WAX. *s.* An officer belonging to the lord chancellor, who fits the wax for the sealing of writs (*Harris*).

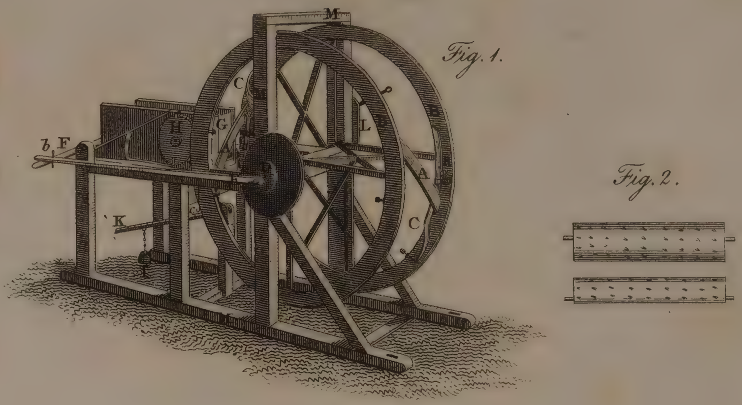
NATURAL HISTORY.

PL. I.

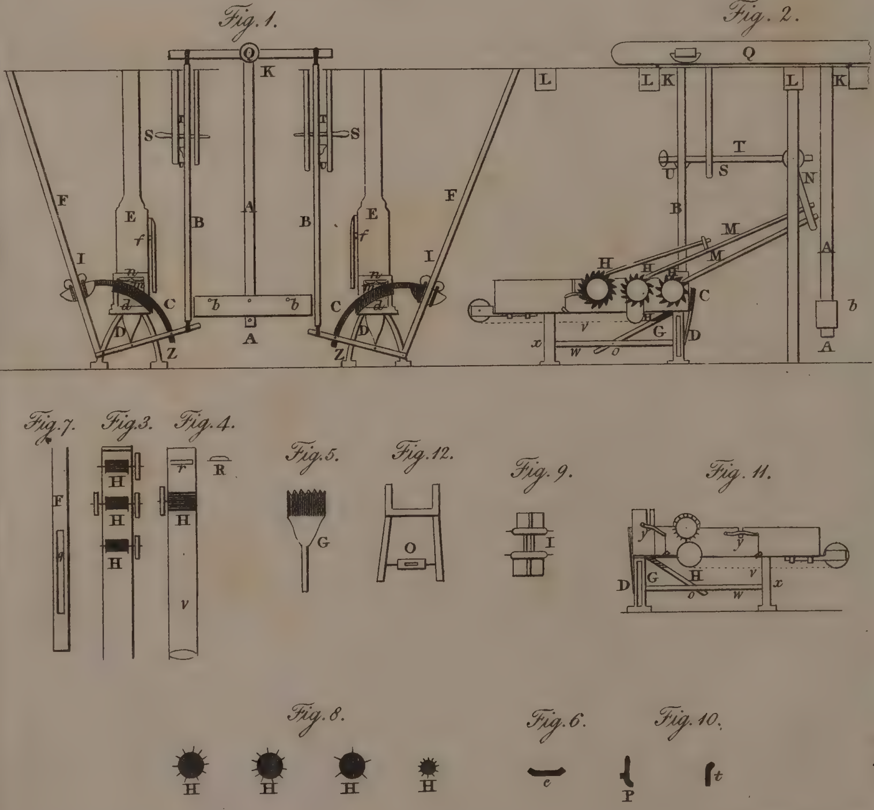


London, Publish'd by G. Kearsley, Fleet Street, June 1, 1809.

Salmon's Chaff Cutter.



Count Riesch's newly invented Straw Cutter.



Mutlow So. Russell Ct.

Published by G. Kearsley, Fleet Street, Decr. 1st 1808.

CHA'FER. s. (ceafor, Saxon.) An insect; a sort of yellow beetle. See SCARABÆUS.

CHA'FERY. *s.* A forge in an iron mill.

CHAFF. *s.* (ceaf, Saxon.) 1. The husks of corn that are separated by thrashing and winnowing (*Dryden*). 2. It is used for any thing worthless.

CHAFF (*palea.*) In botany, the dry calyx of corn and grasses, in common language; by Linnéus called gluma. (See GLUME.) Also, a dry membranaceous body interposed between two florets, in some of the class syngenesia.

CHAFF, in husbandry, denotes not only the husks of the corn separated by screening or winnowing, but straw cut small for the food of cattle.

CHAFF-CUTTER, or STRAW-CUTTER, a machine for making chaff to feed horses.

In the year 1797, the Society for the Encouragement of Arts, &c. conferred a reward of 30 guineas on Mr. Robert Salmon, for his improved machine for cutting straw, of which we have given an engraving, in Pl. 39.

Fig. 1, A, A, are two knives, fixed on the inside of the fellies of two wheels B, B, which are firmly connected; the edges of such knives being at an angle of about 45 degrees from the plane of the wheels' motion. Farther, these knives are directed in such manner, that they are acted upon by the springs C, C; the latter being so adjusted, as to give them the requisite degree of pressure against the box for cutting the straw: to prevent them from coming too forward, and thus occasioning an unnecessary friction, wedges are placed under the staples *a*, *a*, which must be drawn out as the knives wear, so as to facilitate their progress; a contrivance, by which new knives may occasionally be substituted, as they will always be duly regulated by the springs.

D, is a round wooden block, fixed to one side of the wheel, having four holes, and a moveable screw: to this block is attached, by means of screws, one end of the feeding-arm E, which runs in a direction nearly horizontal to the cross-bar F, at the end of the box G. Such end is fixed to the cross-bar, by the pin *b*, which may be shifted to five different holes in F: so that, by means of these, and of the four holes in the block D, twenty changes may be obtained in the length of the chaff.

The straw is brought forward by two rollers in the box G, delineated in fig. 2, which are turned from the outside by the ratch-wheels H, (one being on each side of the box), and move with greater or less velocity, accordingly as the stroke is given to the cross-bar by the feeding-arm and wheel. Thus, when the knife cuts, the straw remains at rest; and, on removing the pin from the cross-bar, the supply immediately ceases; though the motion of the knives may continue.

I, is a pressing weight, suspended beneath the box, which may be rendered more or less powerful, by shifting it on the bearer K, whence it depends: such weight may also be inclined to either side, according to circumstances; and will contribute to force the straw towards the knife, while it counterbalances the ratch-wheel of the upper roller. Near the fulcrum of this bearer is fastened a chain, represented by the dotted line *c*; the upper end of which is connected with a roller, having at each extremity a small iron bar, that is joined to the end of the upper-spiked roller; so that the straw is uniformly pressed between the two cylinders.

L, is a winch, serving to turn the machine.

M, M, M, M, the frame of the implement.

Fig. 2. represents the two rollers above alluded to, in describing the box G.

With a view to employ this straw-cutter to the best advantage, its inventor proposes to place a second box at the end of the first: it may be made of any length, and suspended by a line and counter-weight; by means of which its end is brought down level, while it is filling with straw; then drawn up, so as to give the second box a declivity; and thus the straw is more expeditiously brought forward. The chief improvement of this additional apparatus is, the facility with which straw may be cut, while considerable time is saved; as it will not become necessary to stop at intervals, in order to supply the machine. This machine has been a little improved by Mr. Rowntree.

Dr. Willich gives the following description of count Riesch's newly-invented straw-cutter.

Fig. 1, represents a front view of the machine. See also Pl. 39.

A, the balance, being fastened at the upper end of the cylinder Q, is directed and put in motion by one person: with this view, there is a pivot, P, applied to that cylinder (which pivot is explained in fig. 10, and likewise appears in fig. 2, at K, in a socket, L), which is managed by a handle in the piece of timber, at the lower part of the balance *b*, *b*.

B, B, are the levers which, by the action of the balance A, are alternately raised, so that the knives C, C, cut the supply of straw in *d*, *d*, subsequent to the motion of the arms Z, Z; which are connected with such levers and knives.

C, C, the knives.

D, D, the legs of the boxes: *d*, *d*, represent the projecting straw submitted to the operation.

E, E, the upper parts of the legs before alluded to, terminating, and secured, at the top; in order that the boxes may not be moved or dislodged by the motion of the engine. At *f*, *f*, the two places are visible, through which the moveable arms, fig. 2, M, M, are inserted.

F, F, the beams, which are secured both above and below, and in which the knives are moved by small rollers, as described fig. 9.

m, *m*, (scarcely legible in the plate) are the cushions or guards, which push forward the straw contained in the box: this object is especially promoted by the springs, *n*, *n*, that compress the cushions, and ought, therefore, to be sufficiently strong and elastic: but, according to a later improvement of count Riesch, wood-

screws placed on guard-boards, instead of cushions, more effectually answer the purpose.

S, S, the regulating pins, by means of which the straw may be cut to any length required.

T, T, (being very minute in our plate) represent the diameter of the two levers.

U, U, (below the last-mentioned letters) are small cornices.

Fig. 2, a side view of the engine, in which the whole length of the box is delineated: and, as by the mechanism of this contrivance the straw is pushed forward, the parts by which such purpose is effected are here distinctly represented:

1. The knife C.
2. For the illustration of K, and L, see fig. 6.
3. The ratch-wheels H, as exhibited in another point of view, fig. 3 and 4.
4. The arms M, M.
5. The lever N.
6. The regulator S.
7. The cornice U.
8. The lever T, in full length, and to the extremity of which a sufficient quantity of lead is attached, to prevent it from remaining stationary when elevated.
9. The canvas *v*, which is farther explained in fig. 4, and 11.
10. The lower transverse hole *o*, which is displayed in fig. 11, and 12; as likewise is *w*, in fig. 11.

Fig. 3, a sketch of the inner part of the box, with its compressing boards H, H, H, which are delineated in fig. 2, and 11; but a profile of which, exhibiting their iron teeth or cogs, is given fig. 8, H, H, H, H.

Fig. 4, also represents the inner breadth of the box, though from the lower part, as far as the egulating wheel; farther, the canvas *v*, on which the straw is placed: the latter is carrieda ong by the rotary motion of the wheels, according as the arms are acted upon by the lever. The letters *r* and R, occurring in, and at the side of this figure, will be accounted for in the description of the following.

Fig. 5, is an indented piece of machinery, called the straw-thruster, delineated fig. 2, and which is attached below the feeding-box in front of the frame, being marked by G, fig. 2, and 11. This thruster rises together with the levers; as it is intimately connected with the arms Z, into which the knives are inserted, having the size of the piece denoted by the letter R, (fig. 4), and the aperture, through which it passes at the bottom of the box, being visible at *r*.

Fig. 6, is the socket supporting the roller *e*, by means of the pivot P, represented fig. 10, and which roller moves as may be perceived by the upper beams marked L, L, at K, K, fig. 2.

Fig. 7, section of part of the beam in which the knives C, C, of fig. 1, and 2, move in I, I; so that they may be placed higher or lower: hence their scope or extent of motion may be observed in this figure, pointed out by the letter *q*.

Fig. 8, has already been described in fig. 3.

Fig. 9, has likewise been explained, by stating the mechanism of the beams, F. F.

Fig. 10, has been accounted for, at fig. 1. P, is the pivot; and *t*, the pin which serves to secure the former.

Fig. 11, a view of a box from the opposite side of fig. 2: at the dotted lines *r*, *r*, is the canvas mentioned in the description of fig. 4, with this difference, that in such figure it appears within, while in fig. 11, it is shewn from without, in the same manner as the cloth passes round the ratch-wheels, while the machine is in motion.

Fig. 12, is a section of the box viewed from behind; the piece of wood *o*, at the bottom, with inserted spindles; and the aperture serves for the reception of the lower part of the straw-thruster G, fig. 5. For the arm *w* moves behind at x, fig. 2, and 11, in the same manner as the staves Z, Z, to which the knives are fixed. Lastly, the balancing levers marked *y*, *y*, fig. 11, are designed for the purpose of more firmly compressing the straw by the appropriate boards: at *f*, *f*, fig. 1. is the place in which the arms, M, M, fig. 2, pass and move during the operation of the machine.

The principal advantages of count Riesch's straw-cutter, appear to be the following; namely, 1. that it cuts the straw in two boxes at the same time; 2. that the straw placed in such boxes is regularly advanced, without any farther aid or attention; and, 3. that the chaff thus manufactured is not only eaten with avidity by cattle, but also is more salubrious than any other cut straw; because it is rendered much softer by the powerful compression of the machine. He farther observes, that one man is capable of cutting at least 100 trusses of straw in the course of one day, or within 10 hours; whereas, by the common method, five men are required for performing a similar task.

In order to explain more distinctly the mechanism of this apparently complicated machinery, it should be remarked that, instead of the usual fly-wheels, the whole motion is effected by means of the balance, A. fig. 1, and 2. Thus, one person supplies the two boxes with straw, swings the moveable arms, and manages the work, without any farther assistance. When the engine was first constructed, the action of the balance was extremely difficult, till the levers B, B, fig. 1. were brought nearer to the roller Q; an alteration by which the hypomochlion, or the centre of motion, became shorter, and the power of the lever was better accommodated to the centre of the cylinder. Now the balance was easily moved, and by means of the regulating pins S, S, fig. 1, the straw could be cut of various lengths; but in case it be wanted uncommonly short, the teeth of the ratch-wheel *h*, *h*, *h*, fig. 2, should stand more closely together; in consequence of which, the moveable arms *g*, *g*, *g*, will advance to a shorter distance, and protrude only a few lines of the straw, which may thus be cut to a very diminutive size.

In supplying the box with straw, the workman ought to dispose it in regular layers, as closely compressed as possible; for otherwise, if it be put there in an irregular manner, it will become entangled between the ratch-wheels, and the machinery will either fail of pushing it forward, or protrude it in bundles. Hence, the method of arranging the straw properly requires especial attention; and its regular progression towards the knives cannot be effected, unless every part of the apparatus be in perfect order, and unison with the whole. With this view, the canvas *v*, fig. 2, and 11, which contains the layers within the box (these being rolled forward by means of the cylinders H, H, H, fig. 3), must be properly expanded. The compressing boards H, H, H, fig. 2, and 11, should likewise be firmly applied by the regulating pin S. The levers U, U, fig. 1, and 2, ought to be sufficiently raised in working the machine; as, in the contrary case, the moveable arm (straw-thruster) G, fig. 2, and 5, consequently the moveable arms M, M, would not be sufficiently acted upon, so that the teeth of the ratch-wheels H, H, H, will then make but a slight purchase, while the wheels themselves have not the necessary reaction; thus, little or no straw will be pushed forward to undergo the operation of the knives.

CHAFFER. See SCARABÆUS.

To CHA'FFER. *v. n.* (*kauffen*, German, to buy.) To haggle; to bargain (*Swift*).

To CHA'FFER. *v. a.* Obsolete. 1. To buy (*Spenser*). 2. To exchange (*Spenser*).

CHA'FFERER. *s.* (from *chaffer.*) A buyer; a bargainer.

CHA'FFERN. *s.* (from *eschauffer*, Fr. to heat.) A vessel for heating water.

CHA'FFERY. *s.* (from *chaffer.*) Traffick (*Spenser*).

CHAFFERY, in the iron works, the name of one of the two principal forges. The other is called the finery. When the iron has been brought at the finery into what is called an ancony, or square mass, hammered into a bar in its middle, but with its two ends rough, the business to be done at the chaffery is the reducing the whole to the same shape, by hammering down these rough ends to the form of the middle parts.

CHAFFINCH, in ornithology. See FRINGILLA.

CHA'FFLESS. *a.* Without chaff (*Shaks.*).

CHA'FFWEED. *s.* Cudweed. See CENTUNCULUS.

CHA'FFY. *a.* Like chaff; full of chaff.

CHAFFY RECEPTACLE; in botany paléaceum receptaculum. In which the florets are divided by interposing chaffs or scales. As in dipsacus, scabiosa, hypochæris, catananche, arctium, onopordum, serratula, bidens, santolina, athanasia, xeranthemum, zinnia, anthémis, achillea, verbesina, sigesbeckia, buphthalmum, helianthus, rudbeckia, coreopsis, silphium.

CHA'FINGDISH. *s.* (from *chafe* and *dish.*) A vessel to make any thing hot in; a portable grate for coals (*Bacon*).

CHAGRE, a river of South America, in the isthmus of Darien, which runs into the sea, 30 miles W.S.W. Porto Bello.

CHAGRI'N. *s.* (*chagrine*, Fr.) Ill-humour; vexation; fretfulness; peevishness (*Pope*).

To CHAGRI'N. *v. a.* (*chagriner*, Fr.) To vex; to put out of temper.

CHAIN. *s.* (*chaîne*, French.) 1. A series of links fastened one within another (*Genesis*). 2. A bond; a manacle; a fetter (*Pope*). 3. A line of links with which land is measured (*Locke*). 4. A series linked together, as of causes or thoughts; a succession (*Hammond*).

To CHAIN. *v. a.* (from the noun.) 1. To fasten or bind with a chain (*Knolles*). 2. To keep in slavery (*Pope*). 3. To keep by a chain (*Knolles*). 4. To unite (*Shakspeare*).

CHAIN, a long piece of metal composed of several links or rings, engaged the one in the other. They are made of divers metals, some round, some flat, others square, some single, some double. A gold chain is one of the badges of the dignity of the lord mayor of London, and remains to the person after his being divested of that office, as a mark that he has passed the chair. It is also the badge of office of the sheriff, but only while in office.

CHAIN is also a string of gold, silver, or steel-wire, wrought like a tissue, which serves to hang watches, tweezer-cases, and other valuable toys upon. The invention of these pieces of workmanship was derived originally from England, whence foreigners give them the name of chains of England.

In making these chains, a part of the wire is folded into little links of an oval form, the longest diameter about three lines, the shortest one. These, after they have been exactly soldered, are again folded into two, and then bound together and interwoven by means of several other little threads of the same thickness, some of which passing from one end to the other, imitate the warp of a stuff, and the others, which pass transversely the woof; there are at least four thousand little links in a chain of four pendants, so equally, and at the same time so firmly connected, that the eye takes the whole to consist of one piece.

CHAIN, in surveying, a measure of length, made of a certain number of links of iron-wire, serving to take the distance between two or more places. Here we have,

1. A chain of 50 feet.

2. A chain of one pole or sixteen feet and a half in length; especially useful in measuring and laying out gardens and orchards, or the like, by the pole or rod measure.

3. A chain of 4 poles, or 66 feet, or 22 yards, in length, called Gunter's chain, and is peculiarly adapted to the business of surveying or land-measuring, because that 10 square chains just make an English acre of land; so that the dimensions being taken in these chains, and thence the contents computed in square chains, they are readily turned into acres by dividing by 10, or barely cutting off the last figure from the square chains. But it is still better in practice to proceed thus, viz. count the dimensions, not in chains, but all in links; then the

contents are in square links; and five figures being cut off for decimals, the rest are acres; that is four figures to bring the square links to square chains, and one more to bring the square chains to acres.

In this chain, the links are each 7 inches and $\frac{92}{100}$, or 7·92 inches in length, which is very nearly $\frac{2}{3}$ of a foot. And hence any number of chains or links are easily brought to feet or inches, or the contrary. The best way of doing which is this; multiply the number of links by 66, then cut off two figures for decimals, and the rest are feet; or multiply links by 22 for yards, cutting off two figures. See SURVEYING.

CHAIN-PUMP. See PUMP.

CHAIN-SHOT, two balls with a chain between them. They are used at sea to bring down yards or masts, and to cut the shrouds or rigging of a ship.

CHAIN (Top), on board a ship, a chain to sling the sail-yards in time of battle, in order to prevent them from falling down when the ropes by which they are hung happen to be shot away, or rendered incapable of service.

CHAIN-WALES, or CHANNELS, of a ship, porteboissoirs, are broad and thick planks projecting horizontally from the ship's outside, abreast of and somewhat behind the masts. They are formed to extend the shrouds from each other, and from the axis or middle line of the ship, so as to give a greater security and support to the masts, as well as to prevent the shrouds from damaging the gunwale, or being hurt by rubbing against it.

CHAINS, in ship-building, are strong links or plates of iron, the lower ends of which are bolted through the ship's side to the timbers.

CHAINS (Hanging in), a kind of punishment inflicted on murderers. By the stat. 25 Geo. II. c. 37. the judge shall direct such to be executed on the next day but one, unless Sunday intervene; and their bodies to be delivered to the surgeons to be dissected and anatomized; and he may direct them afterwards to be hung in chains.

CHAIR (*cathedra*), anciently the suggestum or pulpit, whence the priest or public orator spoke to the people. (See CATHEDRA.) It is still applied to the place whence professors or regents in the universities deliver their lectures; thus we say, the professor's chair. It is also applied to the chief magistrate of a city, or rather to the seat appropriated to his office; thus we say, next the chair.

CHAIR, in general, an article of furniture contrived for the purpose of relieving the lower extremities from the incumbent weight of the body.

Chairs with square seats are liable to many objections, when considered with respect to their influence on the health of the aged, infirm, and especially persons afflicted with the piles, or troubled with ascarides. For these, a round, or blunt, triangular form of a chair, resembling the shape of a saddle, would be far preferable, and more conducive to the alleviation of their complaints. The reason is obvious; because the thighs and legs, when compressed, occasion an additional irritation, on a part which is already in a preternatural state of excitement, or, perhaps, subject to chronic inflammation, as is frequently the case in the hemorrhoids. Nor do we advise those patients to accustom themselves to rest upon very soft cushions, or pillows, except such as are tightly stuffed with horse-hair, dry mosses, or chaff. Hence we are of opinion, that the studious, and all those who are engaged in sedentary employments, if they regard their health and convenience, should employ either round, wooden chairs, slightly concave, or such as we have before ventured to suggest. (*Willich.*)

CHAIR (Sedan), a covered vehicle for carrying a single person, being supported by two rather flexible poles, and borne by two men, hence called chairmen. Hume says the first sedan-chair seen in England was used by the duke of Buckingham in the reign of James I, to the great indignation of the people, who exclaimed that he was employing his fellow-creatures to do the service of beasts. The number of sedan-chairs for hire, allowed in London by act 12 Geo. I. c. 12. is 400.

CHAIRMAN, the president of an assembly, or company; thus we say, the chairman of a committee.

CHAIRMAN, signifies also one who carries a sedan-chair.

CHAISE DIEU, a town of France in the department of Upper Loire. Its late benedictine abbey was much celebrated. Lat. 45. 15 N. Long. 3. 4 E.

CHAISE, a sort of light open chariot, or calash. See COACHES.

The invention of chaises is generally ascribed to Augustus; though Aurelius Victor relates that post-chaises were first introduced by Trajan.

CHALASTICS (χαλαστικα, from χαλαω, to relax.) In medicine, relaxants; preparations that let down the tone of animal fibres.

CHALAZA, among naturalists, a white knotty kind of string at each end of an egg, formed of a plexus of the fibres of the membranes whereby the yolk and white are connected together.

Its use, according to Harvey, is to be as it were the poles of this microcosm, and the connection of all the membranes twisted and knit together; whereby the liquors are not only conserved, each in its place, but also in its due position to the rest.

Derham adds, that they also serve to keep one and the same part of the yolk uppermost, let the egg be turned which way it will; which is done by the following mechanism: the chalazæ are specifically heavier than the whites wherein they swim; and being braced to the membrane of the yolk, a little out of the axis, they cause one side of the yolk to be heavier than the other. The yolk being thus by the chalazæ made buoyant, and kept swimming in the midst of two whites, is by its own heavy side kept with the same side always up-

permost: which uppermost side he imagines to be that whereon the cicatricula lies.

CHALAZION (*chalazion*, χαλαζιον, from χαλαζα, a hail-stone.) Chalaza. Grando. An indolent, moveable tubercle on the margin of the eyelid, like a hail-stone.

CHALCEDON and CHALCEDONIA, an ancient city of Bithynia, opposite Byzantium, built by a colony from Megara.

CHALCEDONIUS. Chalcedony. In oryctology, a genus of the class earths, order siliceous: consisting of silica, a small quantity of alumine, with sometimes about a tenth of lime, and a slight trace of oxyd of iron; hard, lightish, shining within, breaking into indeterminate fragments with sharp edges; compact, not mouldering in the air, of a more or less perfectly conchoidal texture; never opake; tough, admitting a high polish, and generally of a common form; not melting before the blow-pipe. Seventeen species. The following are the chief.

1. C. cacholonius. Cacholony: kachelony. Milkwhite; somewhat diaphonous, becoming opake in the fire. Found in the rivers Bucharest and Mungul, and the Feroe Islands, where it sometimes lies between strata of semitransparent chalcedony. It is never found in drops or stalactitical. The Kalmucs make their idols and domestic vessels of it.

2. C. genuinus. Real chalcedony. Common chalcedony. Found in Cornwall and the Hebrides; in Iceland, Siberia, the Feroe Islands, Silesia, Saxony, in various shapes, kidney-shaped, stalactitical, globular, botryoidal, like hollow pebbles, often containing air-bubbles or drops of water; also in angular pieces and veins in porphyry and amygdalite, and sometimes cubic; colour various shades of grey, with sometimes a tinge of green or blue; lustre generally semitransparent, rarely diaphonous; the surface is rough; fracture even, though sometimes passing into the fine splintery or imperfectly conchoidal. Specific gravity from 2,586 to 2,655. Contains

Silica - -	84
Alumina mixt with iron	16
	100

3. C. cæruleus. Blue chalcedony. Found on the shores of Scotland, in the Feroe Islands, Saxony, Bohemia, Hungary, and Transylvania; in most respects, excepting colour, resembling the last.

4. C. niger. Black chalcedony. Found near Chomnick in Saxony imbedded in porphyry.

5. C. lutens. Yellow chalcedony. Found near the river Tour in Siberia, and in Ceylon, Hungary, and Saxony.

6. Carneolus. Carneolian. Cornelian. Blood-red, semi-transparent, of a perfectly conchoidal texture. Found in Arabia and Hindustan, Egypt, and various parts of Europe, generally in roundish pieces, and also in layers in agate: colour various shades of red; rarely opake, and sometimes turbid, with a few slender shades; outer surface rough and uneven, the fragments indeterminately angular and sharp-edged. Specific gravity from 2,630 to 2,700.

7. C. dendriticus. Mocha stone. Pale. painted with deeper-coloured arborescent ramifications. Found in the East, Iceland, the Palatinate of the Rhine, and other parts of Europe; those of the east are esteemed the most valuable.

8. C. fasciatus. Sardonyx. Marked with bands differing in colour and transparency. Found in Ceylon, Feroe, and Iceland, Bohemia, and Saxony: colour grey, somewhat pellucid, with milk-white, diaphonous bands; rarely with rosy or green bands or blueish, or blood-red with white or grey; the bands are narrower or broader, of equal or unequal width, parallel, confluent, straight, angular, or undulate.

9. C. onyx. Onyx. Achates. Breaking into concentrically crustose fragments differing in colour and degree of transparency. Found in the East Indies, Siberia, Bohemia, Portugal, and Saxony, in thicker or thinner fragments, and sometimes in pebbles; the colours, whatever it may chance to be, grey, black, flesh-colour, or intermixed, alternating in various manners, generally in concentric circles. The hardest species of the whole genus. Specific gravity from 2,500 to 2,600.

10. Chrysoprasus. Chrysoprase. Found in Germany, generally in solid masses, sometimes in loose pebbles, or layers of asbest talc, lithomarg and iron ochre: hard, but does not strike fire with steel; colour various shades of apple-green, sometimes other greens. Specific gravity 3,250.

11. C. heliotropius. Heliotrope; bloodstone. Diaphonous; of a conchoidal texture; green marked with opaque blood-red dots and drops. Found in Asia, Persia, Siberia, Iceland, Bohemia, and Franconia in rocks of trap. Specific gravity from 2,620 to 2,700.

CHALCIDENSES, the inhabitants of the isthmus between Teos and Erythræ.

CHALCIDICA, in antiquity, banqueting-houses; some are very curious, says Mr. Perrault, to know what this word signifies. Philander thinks, that this Greek word signifies the places where money-matters were decided, or the office for the mint, supposing that word comes from χαλκος, brass, and δικη, justice. Some will have it read causidica, as much as to say, an hall for pleading. Festus informs us, that chalcidica was a sort of building first found out in the city of Calchis; Arnobus calls chalcidica the fine halls, where the poets feigned that the pagan gods supped. Barbaro and Baldus think it a proper name for that sort of buildings, which Dion says was erected by Julius Cæsar in honour of his father. Palladio follows Barbaro in his design, and draws this building in the fashion of the judgment-seat, described by Vitruvius in the temple of Augustus, which was joined to the great church of Fano.

M. Perrault says, "Being assured by the testimony of Ausonius, that chalcidica was a lofty place, which we call the first story, I

think, that these chalcidicas were large and lofty halls, where justice was administered, erected at the end of their palaces, even with the galleries through which they went out of one room into another, and where the pleaders walked."

CHALCIS, in ancient geography, the chief city of Eubœa, in that part which is nearest to Bœotia. It was founded by an Athenian colony. The island was said to be joined to the continent in the neighbourhood of Chalcis. There were three other towns of the same name in Thrace, Acarnania, and Sicily, all belonging to the Corinthians (*Plin.*), &c.

CHALCIS. In zoology, a genus of the class insecta, order hymenoptera. Mouth with a horny, compressed jaw; feelers four, equal; antennas short, cylindrical, fusiform, the first joint a little thicker; thorax gibbous, lengthened behind in the place of the scutel; abdomen rounded and slightly petiolate. Eleven species, found only hitherto in Europe or South America. The largest, c. asiformis, of the size of the common bee: the rest for the most part much smaller.

CHALCOLIS. In oryctology. See URANIUM.

CHALCO'GRAPHER. *s.* (χαλκογραφος.) An engraver in brass.

CHALCO'GRAPHY. *s.* (χαλκογραφια.) Engraving in brass.

CHALCONDYLAS (Demetrius), a learned Greek, born at Constantinople, left that city after its being taken by the Turks, and afterwards taught Greek in several cities in Italy. He composed a Greek grammar; and died at Milan in 1513.

CHALCONDYLAS (Laonicus), a famous Greek historian of the 15th century, was born at Athens; and wrote an excellent history of the Turks, from Ottoman, who reigned about the year 1300, to Mahomet II. in 1463.

CHALDÆA, a country of Asia, between the Euphrates and Tigris. Its capital is Babylon, whose inhabitants were famous for their knowledge of astrology (*Cic.*).

CHALDÆI, the Chaldæans, a people of the greater Asia, who above all others practised the art of astrology. The prophet Daniel was instructed by them. They worshipped the fire. The Jews likewise affirm, as Jerom says, that those words of Scripture, which say that Abraham came out of Ur of the Chaldees shew, that he was miraculously delivered out of the fire, into which the Chaldæans had cast him because he refused to adore it. It is credible that these Chaldæans worshipped the sun and stars, which they looked upon as eternal fires, and that in keeping a perpetual fire burning upon their altars, they desired to keep and preserve a resemblance of them continually before their eyes.

CHALDEE LANGUAGE, that spoken by the Chaldeans. It is a dialect of the Hebrew.

CHALDEE PARAPHRASE, in the rabbinical style, is called Targum. There are three Chaldee paraphrases in Walton's polyglot; viz. that of Onkelos, that of Jonathan son of Uziel and that of Jerusalem.

CHALDRON, an English dry measure, consisting of thirty-six bushels, heaped up according to the sealed bushel kept at Guildhall, London: but on ship-board, twenty-one chaldrons of coals are allowed to the score. The chaldron should weigh two thousand pounds.

CHALICE, the cup or vessel used to administer the wine in the sacrament, and by the Roman Catholics in the mass. The use of the chalice, or communicating in both kinds, is by the church of Rome denied to the laity, who communicate only in one kind, the clergy alone being allowed the privilege of communicating in both kinds.

CHA'LICED. *a.* (from *calix*, Lat.) Having a cell or cup (*Shakspeare*)

CHALIZA, in Hebrew antiquity, the ceremony whereby a woman left a widow pulled off her brother-in-law's shoes, who should have espoused her; after which she was at liberty to marry whom she pleased.

CHALK. *s.* (cealc, Sax. *calck*, Welsh.) See CRETA.

CHALK. Creta. Carbonas calcis. Pure chalk is a neutral salt, formed by the union of the cretaceous acid with lime. It is much used as an absorbent and antacid, to stop diarrhœas accompanied with acidity of the primæ viæ.

To CHALK. *v. a.* (from the noun.) 1. To rub with chalk (*Hudibras*). 2. To manure with chalk (*Mortimer*). 3. To mark or trace out as with chalk (*Woodward*).

CHALK-CUTTER. *s.* A man that digs chalk.

CHALK-LANDS are thus denominated, from their consisting principally of chalk, with a thin layer of mould or soil over it. They are well calculated for the growth of barley and wheat, and especially of oats, which will thrive well on any kind of chalky land, however indifferent. They naturally produce a small species of vetch, called the smooth podded tare, or tine tare, ervum tetrasperum, L. together with poppies, May-weed, &c. Sainfoin and hop-clover will also succeed on these lands; and, where they are of the better sort, the hare's-foot trefoil, trifolium arvense, L. will thrive. The best manures for this species of soil are, dung, old rags, and the dung left after folding sheep; a practice which is particularly useful here, and which, we hope, will become more general.

CHALK-PIT. *s.* A pit in which chalk is dug (*Woodward*).

CHALK-STONES. It is well known that concretions occasionally make their appearance in joints long subject to gout. These concretions, from their colour and softness, have received the name of chalk-stones. They are usually small, though they have been observed of the size of an egg. It had long been the opinion of physicians that these concretions were similar to the urinary calculi. See CALCULI.

Of course, after the discovery of uric acid by Scheele, it was usual to consider the gouty

chalk-stones as collections of that acid. They were subjected to a chemical analysis by Dr. Wollaston in 1797, who found them composed of uric acid and soda. Gouty concretions are soft and friable. Cold water has little effect upon them; but boiling water dissolves a small portion. If an acid be added to this solution, small crystals of uric acid are deposited on the sides of the vessel. These concretions are completely soluble in potash when the action of the alkaline solution is assisted by heat. When treated with diluted sulphuric or with muriatic acid, the soda is separated; but the uric acid remains, and may be separated by filtration. The liquid, when evaporated, yields crystals of sulphate or muriate of soda, according to the acid employed. The residuum possesses all the characters of uric acid.

When uric acid, soda, and a little warm water, are triturated together, a mass is formed, which, after the surplus of soda is washed off, possesses the chemical properties of gouty concretions. (*British Encyclop.*).

CHALKY. *a.* (from *chalk.*) 1. Consisting of chalk; white with chalk. 2. Impregnated with chalk (*Bacon*).

To CHA'LLENGE. *v. a.* (*chalenger*, Fr.) 1. To call another to answer for an offence by combat (*Shak.*). 2. To call to a contest (*Locke*). 3. To accuse (*Shaksp.*) 4. (In law.) To object to the impartiality of any one (*Hale*). 5. To claim as due (*Addison*). 6. To call to the performance of conditions.

CHALLENGE. *s.* (from the verb.) 1. A summons to combat (*Shak.*). 2. A demand of something as due (*Collier*).

CHALLENGE, in the law of England, is an exception made to jurors; and is either in civil or criminal cases.

In civil cases, challenges are of two sorts; challenges to the array, and challenges to the poll. Challenges to the array are at once an exception to the whole panel, in which the jury are arrayed, or set in order by the sheriff in his return; and they may be made upon account of partiality or some default in the sheriff or his under officer who arrayed the panel. Also, though there be no personal objection against the sheriff, yet if he arrays the panel at the nomination, or under the direction of either party, this is good cause of challenge to the array. Challenges to the polls, *in capite*, are exceptions to particular jurors; and seem to answer the *recusatio judicis* in the civil and canon laws; by the constitutions of which a judge might be refused upon any suspicion of partiality. By the laws of England also, in the times of Bracton and Fleta, a judge might be refused for good cause; but now the law is otherwise, and it is held that judges or justices cannot be challenged. See Blackstone's Commentaries, vol. iii.

In criminal cases, challenges may be made either on the part of the king, or on that of the prisoner; and either to the whole array, or to the separate polls, for the very same reasons that they may be in civil causes. For it is here at least as necessary as there, that the sheriff or returning officer be totally indifferent; that, where an alien is indicted, the jury should be *de medietate*, or half foreigners, if so many are found in the place (which does not indeed hold in treasons, aliens being very improper judges of the breach of allegiance; nor yet in the case of Egyptians under the statute 22 Hen. VIII. c. 10.) that on every panel there should be a competent number of hundreders; and that the particular jurors should be *omni exceptione majores*, not liable to objections either *propter honoris respectum*, *propter defectum*, *propter affectum*, or *propter delictum*.

Challenges on any of the foregoing accounts are styled challenges for cause; which may be without stint in both civil and criminal trials. But in criminal cases, or at least in capital ones, there is, *in favorem vitæ*, allowed to the prisoner an arbitrary and capricious species of challenge to a certain number of jurors, without showing any cause at all; which is called a peremptory challenge: a provision full of that tenderness and humanity to prisoners for which our laws are justly famous. This is grounded on two reasons: 1. As every one must be sensible what sudden impressions and unaccountable prejudices we are apt to conceive upon the bare looks and gestures of another; and how necessary it is that a prisoner, when put to defend his life, should have a good opinion of his jury, the want of which might totally disconcert him; the law wills not that he should be tried by any one man against whom he has conceived a prejudice, even without being able to assign a reason for such his dislike. 2. Because upon challenges for cause shown, if the reason assigned prove insufficient to set aside the juror, perhaps the bare questioning his indifference may sometimes provoke a resentment; to prevent all ill consequences from which, the prisoner is still at liberty, if he pleases, peremptorily to set him aside.

This privilege of peremptory challenges, though granted to the prisoner, is denied to the king by the statute 33 Edward I. stat. 4. which enacts, that the king shall challenge no jurors without assigning a cause certain, to be tried and approved by the court. However, it is held that the king need not assign his cause of challenge till all the panel is gone through, and unless there cannot be a full jury without the persons so challenged; and then, and not sooner, the king's counsel must show the cause, otherwise the juror shall be sworn.

CHA'LLENGER. *s.* (from *challenge.*) 1. One that summons another to combat (*Shakspeare*). 2. One that claims superiority (*Sh.*). 3. A claimant (*Hooker*).

CHALONS-SUR-SAONE, an ancient city of France, in the department of Saone and Loire. It is the ancient Cabilonum. It is the staple of iron for Lyons and St. Etienne, and of the wines for exportation. The great Roman way from Lyons to Boulogne passed by this city. Lat. 46. 47 N. Lon. 4. 57 E.

CHALONS-SUR-MARNE, a handsome town f France, in the department of Marne. It

contains at least 15,000 inhabitants, who carry on a considerable trade in shalloons and other woollen stuffs. Lat. 48. 57 N. Lon. 4. 27 E.

CHALUMEAU, a French term, signifying originally a straw or stalk of corn; afterward, a musical reed or pipe; and is now applied adjectively by musicians to denote the lower notes sounded upon a clarinet, such notes much resembling those brought from a reed.

CHALYBEATE. (*chalybeata, medicamenta*; from *chalybs*, steel.) Of or belonging to iron. A term given to any medicine into which iron enters; as chalybeate mixture. pills, waters, &c.

CHALYBEATE WATER. Aqua chalybeata. Any mineral water which abounds with iron; such are the waters of Tunbridge, Spa, Pyrmont, Cheltenham, Scarborough, and Hartfel.

CHALYBES and CALYBES, in ancient geography, a people of Asia Minor, near Pontus, powerful, and possessed of a great extent of country, abounding in iron mines. They were partly conquered by Crœsus, king of Lydia. Some authors imagine that the Calybes are a nation of Spain (*Virg.*).

CHALYBIS RUBIGO PRÆPARATA. See RUBIGO FERRI.

CHALYBS (*chalybs*, from *chalybes*, a people in Pontus, who dug iron out of the earth.) Steel. The best, hardest, finest, and the closest grained forged iron.

CHAM, or KHAN, the title given to the sovereign princes of Tartary. The word, in the Persian, signifies mighty lord; in the Sclavonic, emperor. Sperlingius, in his Dissertation on the Danish term of majesty, *koning*, king, thinks the Tartarian *cham* may be well derived from it; adding, that in the north they say *kan, konnen, konge, konning*, &c. The term cham is also applied, among the Persians, to the great lords of the court, and the governors of provinces.

CHA'MA. In zoology, a genus of the class vermes, order testacea, animal, a tethys; shell bivalve, rather coarse; hinge with a callous gibbosity, obliquely inserted in an oblique hollow; anterior slope closed. Twenty-five species scattered through the different seas of the globe; of various size and external polish, being in some instances finely glabrous and in others rugose and spinous. The two chiefly worth notice are,

1. C. thaca. Shell roundish longitudinally striate; posterior slope retuse. Inhabits the Chilese shores, where it buries itself in the sands; shell white, violet and yellow, within elegantly purple; about four inches in diameter; the first a very rich and delicate food.

2. C. gigas. Shell plaited with arched scales; posterior slope gaping, with crenulate margin. Inhabits the Indian Ocean; and is sometimes so small as not to measure an inch in length; sometimes far exceeds all other testaceous productions; having been found of the weight of five hundred and thirty-two pounds, and the flesh or inhabitant so large as to furnish a hundred and twenty men with food, and strong enough to cut asunder a cable, and lop off men's hands. Shell lucid, white; sometimes rosy varied with yellow, red and white; posterior aperture ovate; hinge armed with a tooth besides the callus.

CHAMA'DE. *s.* (French.) The beat of the drum which declares a surrender (*Addis.*).

CHAMÆCISSUS. See GLECOMA.

CHAMÆ'DRYS, (*chamædrys*, χαμαιδρυς; from χαμαι, the ground, and δρυς, the oak: so called from its leaves resembling the oak.) Germander. This plant, Teucrium chamædrys; foliis cuneiformi-ovatis, incisis, crenatis, petiolatis; floribus ternis; caulibus procumbentibus, subpilosis, of Linnéus, has a moderately bitter and somewhat aromatic taste. It was in high repute amongst the ancients in intermittent fevers, rheumatism, and gout; and where an aromatic bitter is wanting, germander may be administered with success. See TEUCRIUM.

CHAMÆLEON. In botany, a genus of the class syngenesia, order polygamia, segregata. Calyx six or eight flowered, imbricate, many-leaved; florets tubular, all hermaphrodite; receptacle naked; seeds covered with the calycle growing to them. One species; a native of the South of Europe, with simple white stem, leaves long, narrow, edged with spines; heads oval, scaly: the scales ending in a purple spine; flowers white. This is the cardeus or carline thistle, the carlina acaulis; caule unifloro, flore breviore, of Linnéus. The root of this plant is bitter, and said to possess diaphoretic and anthelmintic virtues. It is also extolled by foreign physicians in the cure of acute, malignant, and chronic disorders.

CHAMÆ'LEON, in zoology. See LACERTA.

CHAMÆME'LUM (*chamæmelum*, χαμαιμηλον; from χαμαι, the ground, and μηλον, an apple; because it grows upon the ground, and has the smell of an apple.) Chamæmelum nobile. Chamomilla romana. Common camomile. Anthemis nobilis; foliis pinnato-compositis linearibus acutis subvillosis, of Linnéus. Both the leaves and flowers of this indigenous plant have a strong, though not ungrateful, smell, and a very bitter, nauseous taste: but the latter are the bitterer, and considerably more aromatic. They possess tonic and stomachic qualities, and are much employed to restore tone to the stomach and intestines, and as a pleasant and cheap bitter. A simple infusion is frequently taken to excite vomiting, or for promoting the operation of emetics. Externally they are used in the decoctum pro fomento, and are an ingredient in the decoctum pro enemate. See ANTHEMIS.

CHAMÆMELUM FLORE PLENO. Double chamomile. A variety of the officinal chamæmelum, produced by culture.

CHAMÆME'LUM VULGA'RE. Chamomilla nostras. The plant directed under this name

in the pharmacopœias is the matricaria chamomilla; receptaculis conicis; radiis patentibus; squamis calycinis, margine æqualibus, of Linnéus. Its virtues are similar to those of the chamæmelum, but in a much inferior degree. See MATRICARIA.

CHAMÆMO'RUS (*chamæmorus*, from χαμαι, on the ground, and μοςεα, the mulberry tree.) Cloud-berries. The ripe fruit of this plant, rubus chamæmorus; foliis simplicibus lobatis, caule interni unifloro, of Linnéus, is prepared in Sweden, &c. into a jam; and is recommended to allay thirst, &c. in fevers, phthisical diseases, hœmoptysis, &c. See RUBUS.

CHAMÆ'PITYS (*chamæpitys*, χαμαιπιτυς; from χαμαι, the ground, and πιτυς, the pine tree.) Common ground pine. This low hairy plant, teucrium chamæpitys; foliis trifidis, linearibus, integerrimis; floribus sessilibus, lateralibus, solitariis; caule diffuso, of Linnéus, has a moderately bitter taste, and a resinous, not disagreeable smell, somewhat like that of the pine. The tops or leaves are recommended as aperients and corroborants of the nervous system, and said to be particularly serviceable in female obstructions and paralytic disorders. See TEUCRIUM.

CHAMÆROPS. Palmetto, or dwarf palm. In botany, a genus of the class polygamia, order trioecia. Calyx three parted; petals three; stamens six; pistils three; drupe three, one-seeded. Three species: South of Europe; Japan; Cochin-china.

CHAMBER, in building, a member of a lodging, or piece of an apartment, ordinarily intended for sleeping in; and called by the Latins cubiculum.

Sometimes the word denotes any retired room; at others, any cavity or hollow; at others, a species of great gun; at others, the cavity where the powder is lodged in a mine. See also the following articles.

CHAMBER (Imperial), is a court or jurisdiction held anciently at Spires, but since transferred to Wertslar; in which are determined the differences arising among the princes and cities of the empire.

CHAMBER (Privy). Gentlemen of the privy-chamber are servants of the king; who are to wait and attend on him and the queen at court, in their diversions, &c. Their number is forty-eight, under the lord-chamberlain; twelve of whom are in quarterly waiting, and two of these lie in the privy chamber.

CHAMBER IN POLICY, is used for the place where certain assemblies are held; also, for the assemblies themselves.

Of these there are various kinds; some established for the administration of justice; others for matters of commerce, &c. Of the first kind among us was the

CHAMBER (Court of Star), an infamous tribunal, so called probably for the following reason. Before the banishment of the Jews under Edward I. their contracts and obligations were denominated in our records starra, or starrs, from a corruption of the Hebrew word shetar, a covenant: when the Jews were expelled the kingdom, the room wherein these starra were deposited was applied to the use of the king's council sitting in their judicial capacity.

This was a court of very ancient original; but new-modelled by statutes 3 Hen. VII. c. 1. and 21 Hen. VIII. c. 20. consisting of divers lords spiritual and temporal, being privy-counsellors, together with two judges of the courts of common-law, without the intervention of any jury. Their jurisdiction extended legally over riots, perjury, misbehaviour of sheriffs, and other notorious misdemeanors, contrary to the laws of the land. Yet this was afterwards (as lord Clarendon informs us) stretched to the most arbitrary purposes; for which reason, it was finally abolished by statute 16 Car. I. c. 10. to the general joy of the whole nation. There is in the British Museum (Harl. MSS. Vol. I. No. 126) a very full, methodical, and accurate account of the constitution and course of this court, compiled by William Hudson of Gray's Inn, an eminent practitioner therein. A short account of the same, with copies of all its process, may also be found in 18 Rym. Foed. 192, &c.

The star-chamber differed from all the other courts of law in this: the latter was governed only by the common law, or immemorial custom, and acts of parliament; whereas the former often admitted for law the proclamations of the king in council, and grounded its judgment upon them. The abolition of this tribunal was, therefore, as De Lolme remarks, justly looked upon as a great victory over regal authority.

CHAMBER, of a mortar, or some cannon, a cell or cavity at the bottom of the bore, to receive the charge of powder. It is not found by experience that chambers have any sensible effect on the velocity of the shot, unless in the largest ordnance, as mortars or very large cannon. Neither is it found that the form of them is very material; a small cylinder is as good as any; though mathematical speculations may shew a preference of one form over another. But in practice, the chief point to be observed, is to have the chamber of a size just sufficient to contain the charge of powder, and no more, that the ball may lie close to the charge; and that its entrance may point exactly to the centre of the ball (*Hutton*).

CHAMBERS OF THE EYE. In anatomy, the space between the capsule of the crystalline lens and the cornea is divided by the iris into two; the space before the iris is termed the anterior chamber; and that behind it the posterior. They are filled with an aqueous fluid.

To CHA'MBER. *v. a.* (from the noun.) 1. To be wanton; to intrigue (*Romans*). 2. To reside as in a chamber (*Shakspeare*).

CHA'MBERER. *s.* (from *chamber*.) A man of intrigue (*Shakspeare*).

CHA'MBERFELLOW. *s.* One that lies in the same chamber (*Spectator*).

CHAMBERLAIN, an officer charged with the management and direction of a chamber.

See CHAMBER IN POLICY. There are almost as many kinds of chamberlains as chambers; the principal whereof are as follows:

CHAMBERLAIN (Lord) of Great Britain, the sixth great officer of the crown; to whom belongs livery and lodging in the king's court; and there are certain fees due to him from each archbishop or bishop when they perform their homage to the king, and from all peers at their creation or doing their homage. At the coronation of every king, he is to have forty ells of crimson velvet for his own robes. This officer, on the coronation day, is to bring the king his shirt, coif, and wearing clothes; and after the king is dressed, he claims his bed, and all the furniture of his chamber for his fees: he also carries, at the coronation, the coif, gloves, and linen, to be used by the king on that occasion; also the sword and scabbard; the gold to be offered by the king, and the robes royal, and crown. To this officer belongs the care of providing all things in the house of lords, in the time of parliament; to him also belongs the government of the palace of Westminster: he disposes likewise of the sword of state, to be carried before the king, to what lord he pleases.

CHAMBERLAIN (Lord) of the household, an officer who has the oversight and direction of all officers belonging to the king's chambers, except the precinct of the king's bedchamber. He has the oversight of the officers of the wardrobe at all his majesty's houses, and of the removing wardrobes, or of beds, tents, music, hunting, messengers, &c. retained in the king's service. He moreover has the oversight and direction of the serjeants at arms, of all physicians, apothecaries, the king's chaplains, &c. and administers the oath to all officers above stairs.

Other chamberlains are those of the king's court of exchequer, of North Wales, of Chester, &c.; in which cases this officer is generally the receiver of all rents and revenues belonging to the place whereof he is chamberlain. In the exchequer there are two chamberlains, who keep a controlment of the pells of receipts and exitus, and have certain keys of the treasury, records, &c.

CHAMBERLAIN OF LONDON, keeps the city money, which is laid up in the chamber of London; he also presides over the affairs of masters and apprentices, and makes free of the city, &c. His office lasts only a year; but the custom usually obtains to re-choose the same person, unless charged with any misdemeanor in his office.

CHAMBERLAINSHIP. *s.* (from *chamberlain.*) The office of a chamberlain.

CHA'MBERLAYNE (Edward), an English writer. He was born at Odington in Gloucestershire, and educated at Oxford, where he took his degrees in arts. After the restoration he was elected F.R.S. and went to Sweden with the earl of Carlisle as his secretary. In 1670 he received the degree of LL.D. from the university of Cambridge. About 1679 he was appointed tutor to Henry duke of Grafton, one of the natural sons of Charles II.; and he had the honour of instructing prince George of Denmark the English language. He died at Chelsea in 1703, and was buried in the churchyard of that parish. He directed by will, that some of his books should be covered with wax and buried with him, that they might be serviceable to future ages. The work by which he is best known is, the Present State of England; which passed through near 40 editions. (*Watkins.*)

CHAMBERLAYNE (John), son of the preceding, and a very voluminous and useful writer. He was educated at Oxford, and died in 1724, aged about 60. He continued his father's Present State of England, translated Nieuwentyt's Religious Philosopher, and other books; and communicated several papers to the Royal Society, of which he was a member.

CHA'MBERMAID. *s.* A maid whose business it is to dress a lady, and wait in her chamber (*Ben Jonson*).

Or, the female who attends to the bedchambers in an inn.

CHAMBERRY, the capital of Savoy, with a castle, and a ducal palace. Its streets are grand, and there are piazzas under many of the houses. It has large and handsome suburbs, and contains about 13000 inhabitants. Lat. 45°. 33 N. Lon. 5. 50 E.

CHAMBERS (Ephraim), author of the scientific dictionary which goes under his name, was born at Milton in the county of Westmoreland. His parents were dissenters of the presbyterian persuasion; and his education no other than that common one which is intended to qualify a youth for trade and commerce. When he became of a proper age, he was put apprentice to Mr. Senex the globe-maker, a business which is connected with literature, and especially with astronomy and geography. It was during Mr. Chambers's residence with this skilful mechanic that he contracted that taste for science and learning which accompanied him through life, and directed all his pursuits. It was even at this time that he formed the design of his grand work, the "Cyclopædia;" and some of the first articles of it were written behind the counter. Having conceived the idea of so great an undertaking, he justly concluded that the execution of it would not consist with the avocations of trade; and therefore he quitted Mr. Senex, and took chambers at Gray's-Inn, where he chiefly resided during the rest of his days. The first edition of the Cyclopædia, which was the result of many years intense application, appeared in 1728, in 2 vols. folio. It was published by subscription, the price being 4l. 4s.; and the list of subscribers was very respectable. The dedication, which was to the king, is very finely written, and dated October 15, 1727. The reputation that Mr. Chambers acquired by his execution of this undertaking, procured him the honour of being elected F.R.S. Nov. 6. 1729. In less than ten years a second edition, and the year after that, a third became necessary, both which were accordingly printed, with additions.

But although the Cyclopædia was the grand business of Mr. Chambers's life, and may be regarded as almost the sole foundation of his fame, his attention was not wholly confined to this undertaking. He was concerned in several other periodical publications, and in conjunction with Mr. John Martyn, F.R.S. and professor of botany at Cambridge, prepared for the press a translation and abridgement in 5 vols. 8vo. of the Philosophical History and Memoirs of the Royal Academy of Sciences at Paris, an undertaking which did not appear till 1742, some time after our author's decease. Mr. Chambers published a translation of the Jesuits Perspective, from the French; which was printed in 4to, and went through several editions. But his close and unremitting attention to his studies at length impaired his health, and obliged him to make an excursion to the south of France, but without that benefit from it which he had himself hoped, and his friends wished. Returning to England, he died at his lodging at Canonbury-house, Islington, May 15, 1740, and was buried at Westminster; where an inscription, written by himself, is placed on the north side of the cloysters of the Abbey. After the author's death, two more editions of his Cyclopædia were published. The publishers also procured a supplement to be compiled, which extended to two volumes more: and in the year 1778, there appeared an edition of both, improved, and incorporated into one alphabet by Dr. Rees, which was completed in 4 vols. folio, and forms a very valuable work. Dr. Rees is now engaged in a quarto edition of a Cyclopædia, which makes a very respectable appearance, and in which the original plan of Chambers's work is greatly enlarged upon. That Mr. Chambers was a man of indefatigable industry, the many extensive works in which he was engaged sufficiently prove: but he was more than this, he was a man of learning; and the admirable preface to his Cyclopædia shews evidently that he was a man of a profound understanding and a brilliant genius.

CHAMBERSBURG, the capital of the county of Franklin, in Pennsylvania. Lat. 39. 56 N. Lon. 77. 41 W.

To CHA'MBLET. *v. a.* (from *camelot.*) To vary; to variegate (*Bacon*).

CHAMBRANLE, in architecture and joinery, the border, frame, or ornament of stone, or wood, surrounding the three sides of doors, windows, and chimneys.

CHAMCAU, the name given by Buffon to the Bactrian camel. See CAMELUS.

CHAMELEON, in amphibiology. See LACERTA.

To CHA'MFER. *v. a.* (*chambrer*, Fr.) To channel; to make furrows on a column.

CHAMFER, in architecture, an ornament on a column consisting of half a scotia.

CHAMFERING, in architecture, the cutting any thing aslope on the under side.

CHAMOIS, in mastiology. See ANTILOPE.

CHAMOMILE, in botany. See ANTHEMIS and MATRICARIA.

CHAMOS, or CHEMOSH, the idol or god of the Moabites. The name of chamos comes from a root, which, in Arabic, signifies to make haste; for which reason many believe chamos to be the sun, whose precipitate course might well procure it the name of swift or speedy. Farther particulars may be seen in Calmet's Dissertation on Baal Peor and Chamos, prefixed to his Comment on the book of Numbers.

CHAMOUNI, a valley, and also a town or village, that lie at the foot of Mont Blanc. The ground floor of the inn at Chamouni is elevated 3367 feet above the Mediterranean. See MONT BLANC and GLACIERS.

To CHAMP. *v. a.* (*champayer*, French.) 1. To bite with a frequent action of the teeth (*Bacon*). 2. To devour (*Spectator*).

To CHAMP. *v. n.* To perform frequently the action of biting (*Hooker*).

CHAMPAGNE, a late province of France, bounded on the north by Hainault and Luxemburg, on the E. by Lorrain and Franche Comte, on the S. by Burgundy, and on the W. by the Isle of France and Soissonnois. Its principal trade consists in excellent wine, all sorts of corn, linen, cloth, woollen-stuffs, cattle, and sheep. It now forms the departments of Ardennes, Aube, Marne, and Upper Marne.

CHA'MPAIGN. *s.* (*campagne*, Fr.) A flat open country (*Milton*).

CHAMPAIN, or POINT CHAMPAIN, in heraldry, a mark of dishonour in the coat of arms of him who kills a prisoner of war after he has called for quarter.

CHAMPARTY, or CHAMPERTY, is the unlawful maintenance of a suit, in consideration of some bargain to have part of the lands or thing in dispute, or part of the gain. By stat. 33 Ed. I. st. 3. both the champartor, and he who consents thereunto, shall be imprisoned three years, and make fine at the king's pleasure.

CHAMPIGNON, in botany. See AGARICUS.

CHAMPION, a person who undertook a combat in the place or quarrel of another; and sometimes the word is used for him who fought in his own cause. It appears that champions, in the just sense of the word, were persons who fought instead of those that, by custom, were obliged to accept the duel, but had a just excuse for dispensing with it, as being too old, infirm, or being ecclesiastics, and the like. Such causes as could not be decided by the course of common law were often tried by single combat; and he who had the good fortune to conquer, was always reputed to have justice on his side. Champions who fought for interest only were held infamous; these hired themselves to the nobility, to fight for them in case of need, and did homage for their pension. When two champions were chosen to maintain a cause it was always required that there should be a decree of the judge to authorise the com-

bat: when the judge had pronounced sentence, the accused threw a gage or pledge, originally a glove or gauntlet, which being taken up by the accuser, they were both taken into safe custody till the day of battle appointed by the judge. Before the champions took the field, their heads where shaven to a kind of crown or round, which was left at the top: then they made an oath that they believed the person who retained them, to be in the right, &c. They always engaged on foot, and with no other weapon than a club and a shield, which weapons were blessed in the field by the priest, with great ceremony; and they always made an offering to the church, that God might assist them in the battle. The action began with railing, and giving each other ill language; and at the sound of a trumpet, they went to blows. After the number of blows or encounters expressed in the cartel, the judges of the combat threw a rod into the air, to advertise the champions that the combat was ended. If it lasted till night, or ended with equal advantage on both sides, the accused was reputed the victor. If the conquered champion fought in the cause of a woman, and it was a capital offence, the woman was burnt, and the champion hanged. If it was the champion of a man, and the crime capital, the vanquished was immediately disarmed, led out of the field, and hanged, together with the party whose cause he maintained. If the crime was not capital, he not only made satisfaction, but had his right hand cut off: the accused was to be close confined in prison, till the battle was over.

Champion of the king, is an officer, whose business is, at the coronation of a king of England, to ride into Westminster-hall, armed cap-a-pie, when the king is at dinner, and throw down his gauntlet by way of challenge; pronouncing, by a herald, "That if any man shall deny, or gainsay the king's title to the crown, he is there ready to defend it in single combat, &c." Which done, the king drinks to him, sending him a gilt cup with a cover, full of wine; which the champion drinks, and has the cup for his fee. This office, ever since the coronation of Richard II., has been continued in the family of Dymocke, who hold the manor of Scrivelsley in Lincolnshire, hereditary from the family of the Marmions, who had it before by grand serjeantry, on condition that the lord thereof should be the king's champion. Accordingly sir Edward Dymocke performed the office at the coronation of Charles II.: and a person named Dymocke performed it at the coronation of his present majesty Geo. III.

To Champion. To challenge (*Shaks.*).

CHAMPLAIN (Lake), a lake of North America, which divides the state of New York from that of Vermont. It is 80 miles long and 14 across in its broadest part. Lat. 45. 0 N. Lon. 74. 10 W.

CHANCE. *s.* (*chance*, French.) 1. Fortune; the cause of fortuitous events (*Sh.*). 2. Fortune; the act of fortune (*Bacon*). 3. Accident; casual occurrence (*South*). 4. Event; success; luck (*Shakspeare*). 5. Misfortune; unlucky accident (*Shaksp.*). 6. Possibility of any occurrence (*Milton*).

Chance. *a.* Happening by chance (*Dryden*).

To Chance. *v. n.* To happen; to fall out; to fortune (*Knolles*).

Chance, a term we apply to events, to denote that they happen without any necessary or foreknown cause. (See Cause.) Our aim is, to ascribe those things to chance, which are not necessarily produced as the natural effects of any proper cause: but our ignorance and precipitancy lead us to attribute effects to chance which have a necessary and determinate cause. When we say a thing happens by chance, we really mean no more than that its cause is unknown to us: not, as some vainly imagine, that chance itself can be the cause of any thing. The case of the painter, who, unable to express the foam at the mouth of a horse he had painted, threw his sponge in despair at the piece, and, by chance, did that which he could not do before by design, is an eminent instance of the power of chance: yet, it is obvious, all we here mean by chance, is, that the painter was not aware of the effect, or that he did not throw the sponge with such a view: not but that he actually did every thing necessary to produce the effect; insomuch that, considering the direction wherein he threw his sponge, together with its form, specific gravity, the colours wherewith it was smeared, and the distance of the hand from the piece, it was impossible, on the present system of things, the effect should not follow. Again, when two travellers determine to go, by the same road, one from London to York, the other from York to London, they will meet somewhere on the road, and this will appear as a matter of chance, though in fact it is a necessary consequence of the previous determinations relative to the journeys in the opposite direction by the same road. That the world could not be formed by chance, see the latter part of the article Boscovich's philosophy.

Chance is frequently personified, and erected into a chimerical being, whom we conceive as acting arbitrarily, and producing all the effects whose real causes do not appear to us; in which sense the word coincides with τυχη, *fortuna*, of the ancients.

Chance is also used for the manner of deciding things, the conduct or direction whereof is left at large, and not reducible to any determinate rules or measures, or where there is no ground for preference: as at cards, dice, lotteries, &c.

The ancient fortilege, or chance, M. Placette observes, was instituted by God himself; and in the Old Testament we find several standing laws and express commands which prescribed its use on certain occasions. Hence the scripture says, the lot, or chance, fell on Matthias, when it was in question who should fill Judas's place in the apostolate. Hence also

arose the sortes sanctorum, or method of determining things, among the ancient Christians, by opening some of the sacred books, and pitching on the first verse they cast their eye on, as a sure prognostic of what was to befal them. The sortes Homericæ, Virgilianæ, Prænestinæ, &c. used by the heathens, were with the same view, and in the same manner. See SORTES.

CHANCE-MEDLEY, in law, is where one is doing a lawful act, and a person is killed by chance thereby; for if the act be unlawful, it is felony. If a person cast, not intending harm, a stone, which happens to hit one, whereof he dies; or shoots an arrow in an highway, and another that passeth by is killed therewith; or if a workman, in throwing down rubbish from a house after warning to take care, kills a person; or a schoolmaster in correcting his scholar, a master his servant, or an officer in whipping a criminal in a reasonable manner, happens to occasion his death; it is chance-medley and misadventure. But if a man throw stones in a highway where persons usually pass; or shoot an arrow, &c. in a market-place among a great many people; or if a workman cast down rubbish from a house in cities and towns where people are continually passing; or a schoolmaster, &c. correct his servant or scholar, &c. exceeding the bounds of moderation; it is manslaughter; and if with an improper instrument or correction, as with a sword or iron bar, or by kicking, stamping, &c. in a cruel manner, it is murder. If a man whip his horse in a street to make him gallop, and the horse runs over a child and kills it, it is manslaughter: but if another whip the horse, it is manslaughter in him, and chance-medley in the rider. In chance-medley the offender forfeits his goods, but has a pardon, of course.

CHANCE (Laws of). Though nothing, on the first view, seems more foreign to the province of the mathematics than games of chance, the powers of analysis have, as we may say, enchained this Proteus, and subjected it to calculation: it has found means to measure the different degrees of the probability of certain events, and this has given rise to a new branch of mathematics, the principles of which we shall here explain.

Def. 1. The probability of an event is the ratio of the chance for its happening to all the chances for its happening or failing: thus, if out of six chances for its happening or failing there were only two chances for its happening, the probability in favour of such an event would be in the ratio of 2 to 6; that is, it would be a fourth proportional to 6, 2, and 1, or $\frac{1}{3}$. For the same reason, as there are four chances for its failing, the probability that the event will not happen, will be in the ratio of 4 to 6, or, in other words, it will be a fourth proportional to 6, 4, and 1, or $\frac{2}{3}$. Hence, if the fractions expressing the probabilities of an event's both happening or failing be added together, they will always be found equal to unity.

Def. 2. The expectation of an event is the present value of any sum or thing which depends either on the happening or on the failing of such an event.

Def. 3. Events are independent, when the happening of any one of them does neither increase nor lessen the probability of the rest. Thus, if a person undertook with a single die to throw an ace at two successive trials, it is obvious (however his expectation may be affected) that the probability of his throwing an ace in the one is neither increased nor lessened by the result of the other trial.

1. If an event may take place in n different ways, and each of these be equally likely to happen, the probability that it will take place in a specified way is properly represented by $\frac{1}{n}$, certainty being represented by unity: or, which is the same thing, if the value of certainty be unity, the value of the expectation that the event will happen in a specified way is $\frac{1}{n}$.

For, the sum of all the probabilities is certainty, or unity, because the event must take place in some one of the ways, and the probabilities are equal; therefore each of them is $\frac{1}{n}$.

Cor. If the value of certainty be a, the value of the expectation is $\frac{a}{n}$. But in the following articles we suppose the value of certainty to be unity.

2. If an event may happen in a ways, and fail in b ways, any of these being equally probable, the chance of it's happening is $\frac{a}{a+b}$, and the chance of it's failing is $\frac{b}{a+b}$.

The chance of it's happening must, from the nature of the supposition, be to the chance of it's failing, as a to b; therefore the chance of it's happening : chance of it's happening, together with the chance of it's failing :: $a : a+b$; and the event must either happen or fail, consequently the chance of it's happening together with the chance of it's failing is certainty; hence, the chance of it's happening : certainty :: $a : a+b$; and the chance of it's happening $=\frac{a}{a+b}$.

Also, since the chance of it's happening together with the chance of it's failing is certainty, which is represented by unity, $1-\frac{a}{a+b}$, that is, $\frac{b}{a+b}$ is the chance of it's failing.

Ex. 1. The probability of throwing an ace with a single die in one trial is $\frac{1}{6}$; the probability of not throwing an ace is $\frac{5}{6}$; the probability of throwing either an ace or a deuce, is $\frac{2}{6}$; &c.

Ex. 2. If n balls a, b, c, d, &c. be thrown promiscuously into a bag, and a person draw out one of them, the probability that it will be a is $\frac{1}{n}$; the probability that it will be either a or b is $\frac{2}{n}$.

Ex. 3. The same supposition being made, if two balls be drawn out, the probability that these will be a and b is $\frac{2}{n \cdot n-1}$.

For there are $n \cdot \frac{n-1}{2}$ combinations of n things taken two and two together; and each of these is

equally likely to be taken; therefore the probability that a and b will be taken is $\frac{1}{n.\frac{n-1}{2}}$ or $\frac{2}{n.\overline{n-1}}$.

Ex. 4. If 6 white and 5 black balls be thrown promiscuously into a bag, and a person draw out one of them, the probability that this will be a white ball is $\frac{6}{11}$; and the probability that it will be a black ball is $\frac{5}{11}$.

3. From the bills of mortality in different places, tables have been constructed which show, how many persons, upon an average, out of a certain number born, are left at the end of each year, to the extremity of life. From such tables, the probability of life, under any proposed circumstances, is known. See LIFE ANNUITIES.

Ex. 1. To find the probability that an individual of a given age will live one year.

Let A be the number, in the tables, of the given age, B the number left at the end of the year; then $\frac{B}{A}$ is the probability that the individual will live one year; and $\frac{A-B}{A}$ the probability that he will die in that time. In Dr. Halley's Tables, out of 586 of the age of 22, 579 arrive to the age of 23; hence, the probability that an individual aged 22 will live one year is $\frac{579}{586}$ or $\frac{83}{84}$ nearly; and $\frac{7}{586}$, or $\frac{1}{84}$ nearly, is the probability that he will die in that time.

Ex. 2. To find the probability that an individual of a given age will live any number of years.

Let A be the number, in the tables, of the given age, B, C, D, . . . X, the number left at the end of 1, 2, 3, . . . t, years; then $\frac{B}{A}$ is the probability that the individual will live one year; $\frac{C}{A}$ the probability that he will live 2 years; and $\frac{X}{A}$ the probability that he will live t years. Also $\frac{A-B}{A}$, $\frac{A-C}{A}$, $\frac{A-X}{A}$, are the probabilities that he will die in 1, 2, t, years.

These conclusions follow immediately from Art. 2.

4. If two events be independent of each other, and the probability that one will happen be $\frac{1}{m}$, and the probability that the other will happen $\frac{1}{n}$, the probability that they will both happen is $\frac{1}{mn}$.

For each of the m ways in which the first can happen or fail, may be combined with each of the n ways in which the other can happen or fail, and thus form mn combinations, and there is only one in which both can happen; therefore the probability that this will be the case is $\frac{1}{mn}$.

Cor. 1. The probability that both do not happen is $1-\frac{1}{mn}$, or $\frac{mn-1}{mn}$. For, the probability that they both happen, together with the probability that they do not both happen is certainty; therefore, if from unity, the probability that they both happen be subtracted, the remainder is the probability that they do not both happen.

Cor. 2. The probability that they will both fail is $\frac{\overline{m-1}.\overline{n-1}}{mn}$. For the probability that the first will fail is $\frac{m-1}{m}$, and the probability that the second will fail is $\frac{n-1}{n}$; therefore the probability that they will both fail is $\frac{m-1}{m}\times\frac{n-1}{n}$, or $\frac{\overline{m-1}.\overline{n-1}}{mn}$.

Cor. 3. The probability that one will happen and the other fail is $\frac{m+n-2}{mn}$. For the probability that the first will happen and the second fail is $\frac{1}{m}\times\frac{n-1}{n}$, and the probability that the first will fail and the second happen is $\frac{m-1}{m}\times\frac{1}{n}$, and the sum of these, or $\frac{m+n-2}{mn}$, is the probability that one will happen and the other fail.

Cor. 4. If there be any number of independent events, and the probabilities of their happening be $\frac{1}{m}$, $\frac{1}{n}$, $\frac{1}{r}$, &c. respectively, the probability that they will all happen is $\frac{1}{mnr\ \&c.}$ For, the probability that the two first will happen is $\frac{1}{mn}$, and the probability that the two first and third will happen is $\frac{1}{mnr}$; and the same proof may be extended to any number of events. When $m=n=r$ &c. the probability is $\frac{1}{m^v}$, v being the number of events.

Ex. 1. Required the probability of throwing an ace and then a deuce with one die.

The chance of throwing an ace is $\frac{1}{6}$, and the chance of throwing a deuce in the second trial is $\frac{1}{6}$; therefore the chance of both happening is $\frac{1}{36}$.

Ex. 2. If 6 white and 5 black balls be thrown promiscuously into a bag, what is the probability that a person will draw out first a white, and then a black ball?

The probability of drawing a white ball first is $\frac{6}{11}$ and this being done, the probability of drawing a black ball is $\frac{5}{10}$, or $\frac{1}{2}$, because there are 5 white and 5 black balls left; therefore the probability required is $\frac{6}{11}\times\frac{1}{2}=\frac{3}{11}$. Or we may reason thus; unless the person draws a white ball first,

the whole is at an end; therefore the probability that he will have a chance of drawing a black ball is $\frac{6}{11}$, and when he has this chance, the probability of it's succeeding is $\frac{5}{10}$, or $\frac{1}{2}$; therefore the probability that both these events will take place is $\frac{6}{11} \times \frac{1}{2}$, or $\frac{3}{11}$.

Ex. 3. The same supposition being made, what is the chance of drawing a white ball and then two black balls?

The probability of drawing a white ball and then a black one is $\frac{3}{11}$; when these two are removed, there are 5 white and 4 black balls left; and the probability of drawing a black ball, out of these, is $\frac{4}{9}$; therefore the probability required is $\frac{3}{11} \times \frac{4}{9} = \frac{4}{33}$.

Ex. 4. Required the probability of throwing an ace, with a single die, in two trials.

The chance of failing the first time is $\frac{5}{6}$, and the chance of failing the next is $\frac{5}{6}$; therefore the chance of failing twice together is $\frac{25}{36}$, and the chance of not failing both times is $1 - \frac{25}{36}$, or $\frac{11}{36}$.

Ex. 5. In how many trials may a person undertake, for an even wager, to throw an ace with a single die?

Let x be the number of trials; then, as in the last Art. the chance of failing x times together is $\overline{\frac{5}{6}}\Big|^{x}$, and this by the question is equal to the chance of happening, or $\overline{\frac{5}{6}}\Big|^{x} = \frac{1}{2}$; hence $x \times \log. \frac{5}{6} = \log. \frac{1}{2}$, or $x \times \overline{\log. 5 - \log. 6} = \log. 1 - \log. 2$, and $x = \frac{\log. 1 - \log. 2}{\log. 5 - \log. 6} = \frac{\log. 2.}{\log. 6 - \log. 5}$, since $\log. 1 = 0$; i. e. $x = 38$, nearly.

Ex. 6. To find the probability that two individuals, P and Q, whose ages are known, will live a year.

Let the probability that P will live a year, determined by Art. 2, be $\frac{1}{m}$; and the probability that Q will live a year, $\frac{1}{n}$; then the probability that they will both be alive at the end of that time is $\frac{1}{m} \times \frac{1}{n}$, or $\frac{1}{mn}$.

Ex. 7. To find the probability that one of them, at least, will be alive at the end of any number of years.

The probability that P will die in a year is $\frac{m-1}{m}$, and the probability that Q will die is $\frac{n-1}{n}$; therefore the probability that they will both die is $\frac{\overline{m-1}.\overline{n-1}}{mn}$, and the probability that they will not both die is $1 - \frac{\overline{m-1}.\overline{n-1}}{mn}$, or $\frac{m+n-1}{mn}$.

In the same manner, if $\frac{1}{p}$ be the probability that P will live t years, and $\frac{1}{q}$ the probability that Q will live the same time; the probability that one of them, at least, will be alive at the end of the time is $1 - \frac{\overline{p-1}.\overline{q-1}}{pq}$, or $\frac{p+q-1}{pq}$.

5. If the probability of an event's happening in one trial be represented by $\frac{a}{a+b}$, to find the probability of it's happening once, twice, three times, &c. exactly, in n trials.

The probability of it's happening in any one particular trial being $\frac{a}{a+b}$, the probability of it's failing in all the other $n-1$ trials is $\frac{b^{n-1}}{\overline{a+b}|^{n-1}}$; therefore the probability of it's happening in one particular trial, and failing in the rest, is $\frac{ab^{n-1}}{\overline{a+b}|^{n}}$; and since there are n trials, the probability that it will happen in some one of these, and fail in the rest, is n times as great, or $\frac{nab^{n-1}}{\overline{a+b}|^{n}}$. The probability of it's happening in any two particular trials, and failing in all the rest, is $\frac{a^2 b^{n-2}}{\overline{a+b}|^{n}}$, and there are $n.\frac{n-1}{2}$ ways in which it may happen twice in n trials and fail in all the rest; therefore the probability that it will happen twice in n trials is $\frac{n.\frac{n-1}{2}a^2b^{n-2}}{\overline{a+b}|^{n}}$. In the same manner, the probability of it's happening exactly three times is $\frac{n.\frac{n-1}{2}.\frac{n-2}{3}a^3b^{n-3}}{\overline{a+b}|^{n}}$; and the probability of its happening exactly t times is $\frac{n.\frac{n-1}{2}.\frac{n-2}{3}\ldots\frac{n-t+1}{t}a^t b^{n-t}}{\overline{a+b}|^{n}}$.

Cor. 1. The probability of the event's failing exactly t times in n trials may be shewn, in the same way, to be $\frac{n.\frac{n-1}{2}.\frac{n-2}{3}\ldots\frac{n-t+1}{t}a^{n-t}b^t}{\overline{a\times b}|}$.

Cor. 2. The probability of the event's happening at least t times in n trials is $\frac{a^n + n a^{n-1} b + n.\frac{n-1}{2}a^{n-2}b^2 \ldots \text{ to } n-t+1 \text{ terms}}{\overline{a+b}|^{n}}$.

For if it happen every time, or fail only once, twice, ... $n-t$ times, it happens t times; therefore the whole probability of its happening at least t times, is the sum of the probabilities of its happening every time, of failing only once, twice, ... $n-t$ times; and the sum of these probabilities is

$$\frac{a^n + na^{n-1}b + n.\frac{n-1}{2}a^{n-2}b^2 \ldots \text{ to } n-t+1 \text{ terms}}{\overline{a+b}|^n}.$$

Ex. 1. What is the probability of throwing an ace, twice, at least, in three trials, with a single die?

In this case, $n=3$, $t=2$, $a=1$, $b=5$; and the probability required is $\frac{1+3.5}{6.6.6}=\frac{16}{216}=\frac{2}{27}$.

Ex. 2. What is the probability that out of five individuals, of a given age, three, at least, will die in a given time?

Let $\frac{1}{m}$ be the probability that any one of them will die in the given time; then we have given the probability of an event's happening in one instance, to find the probability of its happening three times in five instances.

In this case, $a=1$, $b=m-1$, $n=5$, $t=3$; therefore the probability required is

$$\frac{1+5.\overline{m-1}+10.\overline{m-1}|^2}{m^5}. \quad (\textit{Wood's Algebra.})$$

The writers on this branch of science have been comparatively few. In our own language the principal treatises are a large quarto by De Moivre, and a very small work by the celebrated Mr. Thomas Simpson, in which, however, there are some problems never before attempted, or at least never before communicated to the public. In the year 1753, Mr. Dodson rendered this subject more accessible to persons not far advanced in analytical studies, by publishing in his second volume of the Mathematical Repository a number of questions, with their several solutions, with an express reference to the doctrine of life annuities. Other writers on this branch of science are, Huyghens, Monmort, Jas. and Dan. Bernoulli, Emerson, S. Clarke, Bayes, Euler, Price, D'Alembert, Condorcet, M. Young, Waring, &c. See also Montucla Histoire des Mathematiques, tom. iii. pp. 380—422: and for an extensive table of chances on games of play, consult the end of Despiau's Phil. and Math. Amusements, published by Kearsley.

CHA'NCEABLE. *a.* Accidental (*Sidney*).

CHA'NCEFUL. *a.* Hazardous (*Spenser*).

CHANCEL, (from *cancelli*, Lat.) is properly that part of the choir of a church, between the altar, or communion-table, and the balustrade, or rail that encloses it; where the minister is placed at the celebration of the communion. The repairs of the chancel belong, by usage in most parishes, to the rector, or vicar, or both.

CHANCELLOR, an officer supposed originally to have been a notary or scribe under the emperors, and named *cancellarius*, because he sat behind a lattice, called in Latin *cancellus*, to avoid being crowded by the people.

CHANCELLOR (Lord High), of Great Britain, or Lord Keeper of the Great Seal, is the highest honour of the long robe, being made so "per traditionem magni sigilli, per dominum regem," and by taking the oaths: he is the first person of the realm next after the king and princes of the blood in all civil affairs; and is the chief administrator of justice next the sovereign, being the judge of the court of chancery. All other justices are tied to the strict rules of law in their judgment; but the chancellor is invested with the king's absolute power to moderate the written law, governing his judgment purely by the law of nature and conscience, and ordering all things according to equity and justice. The lord chancellor not only keeps the king's great seal; but also all patents, commissions, warrants, &c. from the king, are, before they are signed, perused by him: he has the disposition of all ecclesiastical benefices in the gift of the crown under 20l. a year in the king's books; and he is speaker to the house of lords. To him belongs the appointment of all justices of the peace throughout the kingdom. He is the general guardian of all infants, idiots, and lunatics; and has the general superintendence of all charitable uses in the kingdom.

CHANCELLOR, in Scotland, was the chief in matters of justice. In the laws of king Malcolm II. he is placed before all other officers; and from these it appears that he had the principal direction of the chancery, or chancellary, as it is called, which is his proper office. He had the custody of the king's seal; and he was the king's most intimate counsellor, as appears by an old law cited by sir James Balfour. The office of lord chancellor in Scotland was abolished by the Union, there being no farther use for the judicial part of this office; and, to answer all the other parts of the chancellor's office, a lord keeper of the great seal was appointed, with a salary of 3000l. a year.

CHANCELLOR of a cathedral, an officer that hears lessons and lectures read in the church, either by himself or his vicar; to correct and set right the reader when he reads amiss; to inspect schools; to hear causes; apply the seal; write and dispatch the letters of the chapter; keep the books; take care that there be frequent preachings both in the church and out of it; and assign the office of preaching to whom he pleases.

CHANCELLOR of the duchy of Lancaster, an officer appointed chiefly to determine controversies between the king and his tenants of the duchy land, and otherwise to direct all the king's affairs belonging to that court.

CHANCELLOR of the Exchequer, an officer who presides in that court, and takes care of the interest of the crown. He is always in commission with the lord-treasurer, for the letting of crown-lands, &c. and has power, with others, to compound for forfeitures of lands upon penal statutes. He has also great authority in managing the royal revenues, and in matters relating to the first fruits. Sometimes, as in the case of the late Mr. Pitt, the offices of the first lord of the treasury and chancellor of the exchequer are united; but these, whether united or separate, are always reckoned the prime or first ministers of the crown.

CHANCELLOR of the order of the garter, and other military orders, is an officer who

seals the commissions and mandates of the chapter and assembly of the knights, keeps the register of their proceedings, and delivers acts thereof under the seal of their order.

CHANCELLOR of an university, is he who seals the diplomas, or letters of degrees, provision, &c. given in the university. The chancellor of Oxford is usually one of the principal nobility, chosen by the students themselves in convocation. He is their chief magistrate; his office is, *durante vita*, to govern the university, preserve and defend its rights and privileges, convoke assemblies, and do justice among the members under his jurisdiction. Under the chancellor is the vice chancellor, who is chosen annually, being nominated by the chancellor, and elected by the university in convocation. He is always the head of some college, and in holy orders. His proper office is to execute the chancellor's power, to govern the university according to her statutes, to see that officers and students do their duty, that courts be duly called, &c. When he enters upon his office, he chooses four pro-vice chancellors from the heads of the colleges, to execute his duty in his absence.

The chancellor of Cambridge is also usually one of the first of our nobility, and in most respects the same as that in Oxford; only he does not hold his office *durante vita*, but may be elected every three years. Under the chancellor there is a commissary, who holds a court of record for all privileged persons and scholars under the degree of master of arts, where all causes are tried and determined by the civil and statute law, and by the custom of the university. The vice-chancellor of Cambridge is chosen annually by the senate, out of two persons nominated by the heads of the several colleges and halls.

CHANCELLOR'S COURT. See UNIVERSITY COURTS.

CHANCELLORSHIP, the office of chancellor.

CHANCERY, the grand court of equity and conscience, instituted to moderate the rigour of the other courts that are bound to the strict letter of the law.

The jurisdiction of this court is of two kinds, ordinary or legal, and extraordinary or absolute. The ordinary jurisdiction is that wherein the lord chancellor, who is judge of this court, in his proceedings and judgment is bound to observe the order and method of the common law; in such cases the proceedings which were formerly in Latin, but now in English, are filed or enrolled in the petty-bag office; and the extraordinary, or unlimited power, is that jurisdiction which the court exercises in cases of equity, wherein relief is to be had by bill and answer. The ordinary court holds plea of recognizances acknowledged in the chancery, writs of *scire facias*, for repeal of the king's letters patent, &c.; also of all personal actions, by or against any officer of the court, and of several offences and causes by act of parliament; all original writs, commission of bankrupts, of charitable uses, of idiots, lunacy, &c. are issued hence. The extraordinary court gives relief for and against infants, notwithstanding their minority; for and against married women, notwithstanding their coverture. All frauds and deceits, for which there is no redress at common law, all breaches of trust, confidences, and accidents, as to relieve obligers, mortgagers, &c. against penalties and forfeitures, where the intention was to pay the debt, are here remedied. But in all cases where the plaintiff can have his remedy at law, he ought not to be relieved in chancery; and a thing which may be tried by a jury is not triable in this court.

The court of chancery will not retain a suit for any thing under ten pounds value, except in cases of charity, nor for lands, &c. under forty shillings per annum. In this court all patents, most sorts of commissions, deeds between parties touching lands and estates, treaties with foreign princes, &c. are sealed and enrolled. Out of it are issued writs to convene the parliament and convocation, proclamations, and charters, &c.

The proceedings in chancery are, first to file the bill of complaint, signed by some counsel, setting forth the fraud or injury done, or wrong sustained, and praying relief: after the bill is filed, process of *subpœna* issues to compel the defendant to appear; and when the defendant appears, he puts in his answer to the bill of complaint, if there be no cause for the plea to the jurisdiction of the court, in disability of the person, or in bar, &c. Then the plaintiff brings his replication, unless he files exceptions against the answer as insufficient, referring it to a master to report whether it be sufficient or not; to which report exceptions may also be made. The answer, replication, rejoinder, &c. being settled, and the parties come to issue, witnesses are to be examined upon interrogatories, either in court or by commission in the country, wherein the parties usually join; and when the plaintiff and defendant have examined their witnesses, publication is to be made of the depositions, and the cause is to be set down for hearing; after which follows the decree. But it is now usual to appeal to the house of lords; which appeals are to be signed by two noted counsel, and exhibited by way of petition; the petition or appeal is lodged with the clerk of the house of lords, and read in the house, whereon the appellee is ordered to put in his answer, and a day fixed for hearing the cause; and after counsel heard, and evidence given on both sides, the lords will affirm or reverse the decree of the chancery, and finally determine the cause by a majority of votes, &c.

CHANCRE, (*canker*, French). A primary venereal ulcer on the parts of generation.

CHA'NCROUS. *a.* Having the qualities of a chancre; ulcerous (*Wiseman*).

CHANDELI'ER. *s.* (*chandelier*, French.) A branch for candles.

CHANDEREE, a town of Hindustan Proper, capital of a district in the Malwa country, near the river Betwha. Lat. 24. 48 N. Lon. 78. 43 E.

CHANDERNAGORE, a large town of

Hindoostan Proper, in Bengal, and a French settlement; but in 1793 they were dispossessed by the English. It is seated 13 miles NNW. of Calcutta.

CHA'NDLER. *s.* (*chandelier*, French.) An artisan whose trade is to make candles (*Gay*).

Chandler (Samuel), a learned dissenting divine. He was born at Hungerford in Berkshire in 1693, and educated for the ministry. In 1716 he was chosen minister of the congregation at Peckham, near London, and the income being slender, he set up as a bookseller in the Poultry; which business he continued till he was appointed minister at the Old Jewry. In 1725, he printed a Vindication of the Christian Religion, which met with the approbation of archbishop Wake. On a visit to Scotland he was presented with the degree of D.D. and afterwards was elected fellow of the Royal and Antiquarian Societies. His sermon on the death of George II. in which he compared that monarch to David, occasioned Annet's pamphlet, entitled, The History of the Man after God's own Heart; upon which the doctor wrote his admirable History of the Life of David, in 2 vols. 8vo. He died in 1716, and was buried in Bunhill-fields. His sermons have been printed in 4 vols. 8vo.

Chandler (Mary), an English poetess, and sister of Dr. Chandler, born at Malmsbury in Wiltshire, in 1687. She resided at Bath as a milliner, and one of her poems met with the approbation of Mr. Pope. She was never married, and died in 1745.

CHA'NFRIN. *s.* (old French.) The forepart of the head of a horse (*Farrier's Dict.*).

To CHANGE. *v. a.* (*changer*, French.) 1. To put one thing in the place of another (*Bacon*). 2. To quit any thing for the sake of another (*South. Dryden*). 3. To give and take reciprocally (*Taylor*). 4. To alter; to make other than it was (*Shakspeare*). 5. To mend the disposition of mind (*Shakspeare*). 6. To discount a large piece of money into several smaller (*Swift*).

To Change. *v. n.* To undergo change; to suffer alteration (*Shakspeare*).

Change. *s.* (from the verb.) 1. An alteration of the state of any thing (*Shakspeare*). 2. A succession of one thing in the place of another (*Prior*). 3. The time of the moon in which it begins a new monthly revolution (*Bacon*). 4. Novelty (*Dryden*). 5. An alteration of the order in which a set of bells is sounded (*Norris*). 6. That which makes a variety (*Judges*). 7. Small money (*Swift*). 8. Exchange; a place where persons meet to traffick (*L'Estrange*).

CHA'NGEABLE. *a.* (from *change.*) 1. Subject to change; fickle; inconstant. 2. Possible to be changed (*Arbuthnot*). 3. Having the quality of exhibiting different appearances (*Shakspeare*).

CHA'NGEABLENESS. *s.* (from *changeable.*) 1. Inconstancy; fickleness (*Sidney*). 2. Susceptibility of change (*Hooker*).

CHA'NGEABLY. *ad.* Inconstantly.

CHA'NGEFUL. *a.* Inconstant; uncertain; mutable; subject to variation (*Pope*).

CHA'NGELING. *s.* (from *change.*) 1. A child left or taken in the place of another (*Spenser*). 2. An idiot; a natural (*Dryden*). 3. One apt to change; a waverer (*Hudibras*). 4. Any thing changed and put in the place of another (*Shakspeare*).

CHA'NGER. *s.* One that is employed in changing or discounting money.

Changer (Money), a banker who deals in the receipt, exchange, and payment of moneys.

CHANGES, in arithmetic, &c. the permutations or variations of any number of quantities; with regard to their position, order, &c. The rule is applied to determine how many changes may be rung on a number of bells, or how many different ways any number of persons may be placed, or how many several variations may be made of any number of letters, or any other things proposed to be varied. See Alteration.

CHANG-TONG, a maritime province of China, on the eastern coast. It contains 6 cities of the first, and 114 of the second and third classes. It is traversed by the river Yun, or grand imperial canal. The capital is Tsinan-fou. The celebrated Confucius was born at Kio-feou in this province.

CHANMANNING, a city of Thibet, which has been the residence of the Grand Lama. Lat. 31. 0 N. Lon. 89. 45 E.

CHA'NNEL. *s.* (*canal*, French.) 1. The hollow bed of running waters (*Spenser*). 2. Any cavity drawn longwise (*Dryden*). 3. A strait or narrow sea, as St. George's channel, the British channel, the Bristol channel, &c. 4. A gutter or furrow of a pillar.

Channel, in building. See Gutter.

Channel of the volute, in the Ionic capital, is the face of its circumvolution inclosed by a listel.

To Cha'nnel. *v. a.* To cut any thing in channels (*Wotton. Blackmore*).

CHANNELLED, (*canaliculatus*). In botany, hollowed above with a deep longitudinal groove; convex underneath. Applied to the stem, leaf, and petiole.

CHANNELINGS, the same as flutings.

CHAN-SI, one of the smallest provinces of China, bordering on the great wall. It contains 5 cities of the first class, and 85 of the second and third. The capital is Tairjuen-fou.

To CHANT. *v. a.* (*chanter*, French.) 1. To sing (*Spenser*). 2. To celebrate by song (*Bramhall*).

To Chant, *v. n.* To sing, to make melody with the voice (*Dryden*).

Chant, *cantus*, is used for the vocal music of churches. In church-history we meet with various kinds of chant or song. The first is the Ambrosian, established by St. Ambrose. The second the Gregorian chant, introduced by pope Gregory the Great, who established schools of chantors, and corrected the church-song. This is still retained in the church under the name of plain-song: at first it was called the Roman-song. The plain or Gre-

gorian chant, is where the choir and people sing in unison, or all together in the same manner.

CHANTER, or CHANTOR, one who sings in choirs, a chorister.

CHA'NTICLEER. *s.* (from *chanter* and *clair*, French.) The cock, from the clearness and loudness of his crow (*Dryden*).

CHANTILLY, a town of France, 17 miles from Paris; celebrated for a fine forest and magnificent hunting seat, which, before the late revolution, belonged to the prince of Condé. Lat. 49. 11 N. Lon. 2. 36 E.

CHANTLATE, in building, a piece of wood fixed at the bottom of rafters, over which when the tiles are brought they so project out, that the rain water from the roof does not drop on the wall.

CHANTONG, a fruitful and pleasant province of China; bounded by Pe-tche-li, Honan, Kiang-nan, and the sea. It contains 6 cities of the first class, and 114 of the second and third. This province has extensive silk manufactures.

CHA'NTRESS. *s.* A woman singer (*Milt.*).

CHANTRY, or CHAUNTRY, a church or chapel endowed with lands, &c. for the maintenance of one or more priests to say mass for the souls of the donors. Hence,

CHANTRY-RENTS are still paid to the crown by the purchasers of those lands.

CHAOLOGY, the history or description of the chaos.

CHAOS, that confusion in which matter lay when newly produced out of nothing at the beginning of the world, before God, by his almighty word, had put it into the order and condition wherein it was after the six days creation. Chaos is represented by the ancients as the first principle, ovum, or seed of nature and the world. All the sophists, sages, naturalists, philosophers, theologues, and poets, held that chaos was the eldest and first principle, το αρχαιον χαος. It does not appear who first broached the notion of a chaos. Moses, the eldest of all writers, derives the origin of this world from a confusion of matter, dark, void, deep, without form, which he calls *tohu bohu*; which is precisely the chaos of the Greek and barbarian philosophers. Moses goes no further than the chaos; nor tells us whence it took its origin, or whence its confused state; and where Moses stops, there, precisely, do all the rest, and there will we.

CHA'OTIC. *a.* Resembling chaos; confused.

To CHAP. *v. a.* (*kappen*, Dutch.) To break into gapings (*Blackmore*).

CHAP. *s.* A cleft; a gaping; a chink (*Burnet*).

CHAP. *s.* The upper or under part of a beast's mouth (*Grew*).

CHAPE. *s.* (*chappe*, French.) The catch of any thing by which it is held in its place (*Shakspeare*).

CHAPEAU, in a general sense. See HAT.

CHAPEAU, in heraldry, an ancient cap of dignity worn by dukes, being scarlet-coloured velvet on the outside, and lined with fur. It is often borne above an helmet instead of a wreath, under gentlemen's crests.

CHAPEL, (from *capella*), a place of divine worship, served by an incumbent under the denomination of a chaplain.

In England there are several sorts, 1. Parochial chapels, which, differing from parish churches only in the name, are generally small, as the inhabitants within the district are few. If there is a presentation *ad ecclesium* instead of *ad capellam*, and an admission and institution upon it, it is no longer a chapel, but a church. 2. Chapels which adjoin to and are part of the church: such were formerly built by honourable persons as burying-places for themselves and their families. 3. Chapels of ease, built in very large parishes for the convenience of such as cannot repair to the parish church. These are served by inferior curates provided at the charge of the rector, and consequently removeable at his pleasure. 4. Free chapels, such as were founded by the kings of England, free from all episcopal jurisdiction, and to be visited only by the founder and his successors: the visitation is made by the lord chancellor. The king likewise may license any subject to build and endow a chapel, and by letters patent exempt it from the visitation of the ordinary. 5. Chapels in universities belonging to particular colleges, which, though consecrated, and though sacraments are administered there, are not liable to the visitation of the bishop. 6. Domestic chapels, built by gentlemen for the private service of God in their own families. These may be erected without the leave of the bishop, and need not be consecrated, though they were anciently: they are not subject to the visitation of the ordinary.

CHAPEL, is also applied by courtesy to some other places of worship: thus we say, Roman Catholic chapels, Methodist chapels, &c.

CHAPEL (Knights of the), called also poor knights of Windsor, were instituted by Henry VIII. in his testament. Their number was at first thirteen, but has been since augmented to twenty-six. They assist in the funeral services of the kings of England: they are subject to the office of the canons of Windsor, and live on pensions assigned them by the order of the garter. They bear a blue or red cloke, with the arms of St. George on the left shoulder.

CHAPEL IN FRITH, a town of Derbyshire, with a market on Saturdays. Lat. 53. 22 N. Lon. 1. 35 W.

CHAPELAIN (John), a French poet, born in 1595, and died in 1674. He was a miser as well as a poet, and amassed great riches, which for one of that profession is wonderful.

CHA'PELESS. *a.* Wanting a chape (*Sh.*).

CHAPELET, in the manage, a couple of stirrup-leathers, mounted each of them with a stirrup, and joining at top in a sort of leather buckle, called the head of the chapelet, by which they are made fast to the pummel of the saddle, after being adjusted to the rider's length and bore. They are used both to avoid the trouble of taking up or letting down the stirrups every time that a gentleman mounts on a

F 2

different horse and saddle, and to supply what is wanting in the academy saddles, which have no stirrups to them.

CHAPELLE (Claude Emanuel Lullier), a French poet, born in 1621, and educated under Gassendus. He was the intimate friend of Moliere, who consulted him in the composition of his comedies. He died in 1686. His works were printed at Amsterdam in 1708.

CHA'PELLANY. *s.* (from *chapel.*) A place founded within some church (*Ayliffe*).

CHA'PELRY. *s.* (from *chapel.*) The jurisdiction or bounds of a chapel.

CHAPERON, CHAPERONNE, or CHAPEROON, properly signifies a sort of hood or covering of the head, anciently worn both by men and women, the nobles and the populace, and afterwards appropriated to the doctors and licentiates in colleges, &c. Hence the name passed to certain little shields, and other funeral devices, placed on the foreheads of the horses that drew the hearses in pompous funerals, and which are still called *chaperoons*, or *shafferoons*; because such devices were originally fastened on the *chaperonnes*, or hoods, worn by those horses with their other coverings of state.

CHA'PFALN. *a.* (from *chap* and *fall.*) Having the mouth shrunk (*Dryden*).

CHA'PITER. *s.* (*chapiteau*, French.) The capital of a pillar (*Exodus*).

CHAPLAIN, an ecclesiastical person, in the house of a prince, or person of quality, who officiates in their chapels, &c. In England there are 48 chaplains to the king, who wait four each month, preach in the chapel, read the service to the family, and to the king in his private oratory, and say grace in the absence of the clerk of the closet. While in waiting they have a table, and attendance, but no salary. In Scotland the king has six chaplains, with a salary of 50l. each, three of them having in addition the deanery of the chapel-royal divided between them, making up above 100l. to each. Their only duty at present is to say prayers at the election of peers for Scotland to sit in parliament. According to a statute of Henry VIII. the persons vested with a power of retaining chaplains, together with the number each is allowed to qualify, is as follows: An archbishop, eight; a duke or bishop, six; marquis or earl, five; viscount, four; baron, knight of the garter, or lord chancellor, three; a duchess, marchioness, countess, baroness, the treasurer and comptroller of the king's house, clerk of the closet, the king's secretary, dean of the chapel, almoner, and master of the rolls, each of them two; chief justice of the king's bench, and warden of the cinque-ports, each one. All these chaplains may purchase a licence or dispensation, and take two benefices with cure of souls. A chaplain must be retained by letters testimonial under hand and seal; for it is not sufficient that he serve as chaplain in the family. The first chaplains are said to have been those instituted by the ancient kings of France, for preserving the chape, or cape, with the other relics of St. Martin, which the kings kept in their palaces, and carried out with them to the war. The first chaplain is said to have been Gul. de Mesmes, chaplain to St. Louis.

CHA'PLAINSHIP. *s.* (from *chaplain.*) 1. The office or business of a chaplain. 2. The possession or revenue of a chapel.

CHA'PLESS. *a.* (from *chap.*) Without any flesh about the mouth (*Shakspeare*).

CHA'PLET. *s.* (*chapelet*, French.) 1. A garland or wreath to be worn about the head (*Dryden*). 2. A string of beads used in the Romish church. 3. (In architecture.) A little moulding carved into round beads.

CHA'PMAN. *s.* (ceapman, Sax.) A cheapner; one that offers as a purchaser (*Dryden*).

CHAPPE D'AUTEROCHE (John), a French mathematician, born of a noble family in Upper Auvergne, 1728, and studied in the college of Louis le Grand, where he made a rapid progress in the mathematics. The celebrated Cassini became his friend, and employed him in delineating his general map of France. In 1752 the abbé Chappe translated into French the works of Dr. Halley, with additions; and soon after he was appointed superintendant of some important works in Lorraine. On his return to Paris he was chosen member of the Academy of Sciences, and in 1759 was promoted to be assistant astronomer. He went to Tobolsk in Siberia in 1760, in order to observe the transit of Venus, which was to happen June 6th of the year following. In 1768 he published an account of his journey in 3 vols. 4to. and the same year went to Calefornia, to observe the transit of Venus, which was to happen in 1769. He died after having completed his observation in that country, August 1, 1769. Many of his papers, possessing considerable merit, were inserted in the Memoirs of the Academy.

CHAPPE, in heraldry, the dividing an escutcheon by lines drawn from the centre of the upper edge to the angles below, into three parts, the sections on the sides being of different metal or colour from the rest.

CHAPPEL (William), a learned and pious bishop of Cork, Cloyne, and Ross, in Ireland, born in Nottinghamshire in 1582. When the troubles began under Charles I., he was prosecuted by the puritan party in parliament, and retired to Derby, where he devoted himself to study until his death in 1649. He wrote Methodus Concionandi, i. e. the Method of Preaching; and he is one of those to whom the Whole Duty of Man has been attributed. He left behind him also his own life written by himself in Latin, which has been twice printed.

CHAPS. *s.* (from *chap.*) The mouth of a beast of prey (*Dryden*).

CHAPT. CHA'PPED. The part. pass. of *chap*.

CHAPTER, in ecclesiastical policy, a society or community of ecclesiastics belonging to a cathedral or collegiate church.

It was in the eighth century that the body of canons began to be called a chapter. The chapter of the canons of a cathedral were a

standing council to the bishop, and during the vacancy of the see had the jurisdiction of the diocese. In the earlier ages, the bishop was head of the chapter; afterwards abbots and other dignitaries, as deans, provosts, treasurers, &c., were preferred to this distinction. The deans and chapters had the privilege of choosing the bishops in England, but Henry VIII. got this power vested in the crown: and as the same prince expelled the monks from the cathedrals, and placed secular canons in their room, those he thus regulated were called deans and chapters of the new foundation; such are Canterbury, Winchester, Ely, Carlisle, &c. See BISHOP.

CHAPTER is also used for a division of a book; contrived for keeping the matters treated thereon more separate, clear, and distinct.

The ancients were unacquainted with the division of books into chapters and sections. Papias says, the name chapter, caput, arose hence, "quòd sit alterius sententiæ caput, or quòd capiat totam summam." St. Augustine compares chapters to inns, inasmuch as these refresh the reader, as those the traveller.

The division of the Bible into chapters is attributed by some to Stephen Langton, archbishop of Canterbury, in the reigns of king John and Henry III. But it was really done by cardinal Hugo, who flourished about the year 1240, the author of the first Scripture Concordance, with a view of rendering this work an useful index to the scripture. The chapters were again subdivided, not into verses, but by the letters A, B, C, D, E, F, G, placed in the margin at an equal distance from each other, according to the length of the chapters. In some all the seven letters were used; in others fewer, as the length of the chapters required. In 1445, Rabbi Nathan, a famous rabbi among the Western Jews, finished a Concordance to the Hebrew Bible, in the manner of Hugo's above mentioned; and introduced the division of the Hebrew Bible into chapters: he also improved on his plan, by using the ancient division into verses, and by numbering them, fixing the numerical letters in the margin at every fifth verse. Athias, in his edition of the Bible, 1661 and 1667, introduced the Indian figures, and placed them at every verse. R. Stephens made the division of the chapters of the New Testament into verses, for the sake of a concordance to the Greek Testament, which was printed by his son, H. Stephens.

CHA′PTREL. *s.* The capitals of pillars, or pilasters, which support arches (*Moxon*).

CHAR, in ichthyology. See SALMO.

To CHAR. *v. a.* (See CHA′RCOAL.) To burn wood to a black cinder (*Woodward*).

CHAR. *s.* (cẏꞃꞃe, work, Sax.) Work done by the day; a single job or task (*Dryden*).

To CHAR. *v. n.* To work at others houses by the day (*Dryden*).

CHAR-WOMAN. *s.* A woman hired accidentally for odd work (*Swift*).

CHARA, in astronomy. See CANES VENATICI.

CHARA, in botany, a genus of the class monoecia, order monandria. Male, calyxless, corolless. Female, calyx four-leaved; corolless; stigma three-cleft; berry many-seeded. Four species: three of which are aquatics of our own country, and found in our ditches and pools.

CHARACTER. *s.* (*character*, Latin.) 1. A mark; a stamp; a representation (*Milton*). 2. A letter used in writing or printing (*Hold*). 3. The hand or manner of writing (*Shakspeare*). 4. A representation of any man as to his personal qualities (*Denham*). 5. An account of any thing as good or bad (*Addison*). 6. The person with his assemblage of qualities; a personage (*Dryden*). 7. Personal qualities; particular constitution of the mind (*Pope*). 8. Adventitious qualities impressed by a post or office (*Atterbury*).

To CHA′RACTER *v. a.* To inscribe; to engrave (*Shakspeare*).

CHARACTER, in natural history, the peculiar circumstance or circumstances that distinguish an animal or vegetable, or a set of animals or vegetables, from all others. Characters are specifical, generical, or classical; essential, natural, or artificial. See CLASS, GENUS, SPECIES; ESSENTIAL, FACTITIOUS, NATURAL.

CHARACTERS, numerical, or numeral characters, used to express numbers; they are either figures or letters. The most common numeral characters are those called Arabic or Indian, viz. 1, 2, 3, 4, 5, 6, 7, 8, 9, with 0 or cypher for nothing.

Roman numerals. See NOTATION ROMAN.

Greek numerals. The Greeks had three ways of expressing numbers. 1. Every letter, according to its place in the alphabet, denoted a number, from α, one, to ω, twenty-four. 2. The alphabet was divided into eight units, α one, β two, γ three, &c.; into eight tens, ι ten, κ twenty, λ thirty, &c.; and eight hundreds, ρ one hundred, σ two hundred, τ three hundred, &c. 3. Ι stood for one, Π five, Δ ten, Η a hundred, Χ a thousand, Μ ten thousand; and when the letter Π inclosed any of these, except Ι, it shewed the inclosed letter to be five times its value; as |Δ| fifty, |Η| five hundred, |Χ| five thousand, |Μ| fifty thousand.

Hebrew numerals. The Hebrew alphabet was divided into 9 units: א 1, ב 2, &c.—9 tens: י 10, ב 20, &c.—9 hundreds: ק 100, ר 200, &c. ך 500, מ 600, ן 700, ף 800, ץ 900. Thousands, (1) were sometimes expressed by the units prefixed, to hundreds, as, ארלד, 1534, &c. and even to tens, as, אע, 1070, &c.; 2. but generally by the word אלף, 1000; אלפים, 2000; אלפים, with the other numerals prefixed to signify the number of thousands: e. g. נאלפים, 3000, &c.

CHARACTERS *used in different parts of the mathematics*, generally for the sake of brevity and perspicuity.

CHARACTERS.

1. *Astronomical Characters.*

Planets, &c.

☉ The Sun
☽ The Moon
⊕ The Earth
☿ Mercury
♀ Venus
♂ Mars
♃ Jupiter
♄ Saturn
♅ Herschel, or the Georgian Planet
☊ Ascending Node
☋ Descending Node.

The Twelve Signs or Constellations of the Zodiac.

♈ Aries, the Ram
♉ Taurus, the Bull
♊ Gemini, the Twins
♋ Cancer, the Crab
♌ Leo, the Lion
♍ Virgo, the Maid
♎ Libra, the Balance
♏ Scorpio, the Scorpion
♐ Sigittarius, the Archer
♑ Capricorn, the Goat
♒ Aquarius, the Water-bearer
♓ Pisces, the Fishes.

The Aspects, Time, Motion, &c.

☌ Conjunction
☍ Opposition
⚹ Sextile
□ Quartile
△ Trine
° Degrees
′ Minutes or Primes
″ Seconds, &c.
A. M. Ante merid. or m. morn.
P. M. Post merid. or a aftern.
h, m, s, Hours, min. sec.

2. *Characters in Geometry and Trigonometry.*

□ A Square	∠ An Angle
△ A Triangle	∟ A Rightangle
▭ A Rectangle	⊥ A Perpendicular
○ or ⊙ A Circle.	∥ A Parallel.

3. *Characters used in Arithmetic, Algebra, and the Modern Analysis.*

This character + is called *plus*, or *more*, and denotes addition, or a positive quantity.

The character —, called *minus* or *less*, denotes subtraction and a negative quantity.

∽ has been used to denote similitude; but it is now generally placed between two quantities to denote their difference, when it is not known which is the greatest: the sign — being placed, as a sign of subtraction, only between two quantities the first of which is the greatest

=, *equal*, the sign of equality; the character was first used by Recorde. Descartes uses ∝ for the same purpose. Thus $5 = 3+2$, or $5 \propto 3+2$, denotes that 5 is equal to the sum of 3 and 2.

×, *into* or *with*, denotes that the characters between which it is placed are to be multiplied into one another. In algebraic expressions when two or more letters stand together without any mark between them, it is to be understood that they are to be multiplied continually together: thus abc, is the same in value as $a \times b \times c$, and each denotes the product arising from the continual multiplication of the quantities represented by a, b, and c. When one or both the factors are compounded of several quantities, a line, called a *vinculum* or band, is drawn over the terms of each factor; thus the product of $a+b-c$ into $d+e$, is denoted by $\overline{a+b-c} \times \overline{b+e}$. Sometimes the compound factors are included in parentheses, as $(a+b-c) \times (d+e)$ may represent the product above expressed. A simple dot is often placed between two factors to represent their product; then $b+c$ multiplied by d, would stand thus $\overline{b+c}.\, d$.

÷, *by*, is the character of division; when placed between two quantities, the latter is the divisor. Hence 8 divided by 2 is expressed thus, $8 \div 2$. In algebra the quotient is often expressed like a fraction: for instance, $\frac{a}{b}$ denotes the quotient of a dividend by b; and $\frac{a+b-c}{de}$, the quotient of $a+b-c$ divided by de.

Dr. Pell uses the character ⊚ for *involution*, and for *evolution*.

In algebra powers are sometimes denoted by repeating the quantity; as aa, aaa, $aaaa$, denote the 2d, 3d, and 4th powers of the quantity a. It is more usual, though, to set the numeral index of the power at the top of the figure or letter which represents the quantity involved, thus 5^3, 5^4, 5^5, x^3, x^4, x^5, denote the third, fourth, and fifth powers of 5 and of x respectively.

The character of *radicality*, or extraction of roots, is this, $\surd$: when this character is used alone, it represents the square root; other roots are denoted by their numeral indices placed above the sign. Thus $\sqrt{a+b}$, $\sqrt[3]{a+b}$, $\sqrt[4]{a+b}$ and $\sqrt[5]{a+b}$, denote the square, cube, fourth, and fifth roots of the compound quantity $a+b$. Fractional indices are, now, frequently used at the right hand of quantities to signify roots: thus $\overline{a+b}^{\frac{1}{2}}$, $\overline{a+b}^{\frac{1}{3}}$, $\overline{a+b}^{\frac{1}{4}}$, $\overline{a+b}^{\frac{1}{5}}$, represent the same roots as above.

Harriot uses > for greater, and ∠ for less: Oughtned uses ⊐ and ⊏ for the same purpose.

Proportion is marked by dots; as $2:4::6:12$, denotes that 2 are to 4, as 6 to 12. Continued geometrical proportion is signified by this mark, ∺.

When one quantity varies always in the same ratio as another does, a circumstance often expressed by the word *as*, it is thus characterised ∝. Thus $S \propto D^3$, means that S varies as D^3.

The character of mathematical infinity is ∞. Thus, in the fraction $\frac{x^4}{x-a}$, when x

$= a$, we have $\frac{z^4}{x-a} = \infty$.

Known quantities in algebra are generally represented by the first letters of the alphabet; unknown ones by the last letters. Indeterminate exponents are commonly denoted by one of the letters *m*, *n*, *r*, *s*, *t*, as a^n, c^t, &c.

A point or dot is used in decimal arithmetic, to separate the whole number from the decimals: in this case it is best to place the separating point near the tops of the figures, as it cannot then be mistaken for a stop: for instance, 48·275, is preferable to 48,275, or 48.275.

Dots are used in circulating decimals to mark out the number of repeating figures: for example, 46·12475 is a mixed circulate, of which the figures 2475 constitute the recurring part.

Dots are also used in fluxions, and d's in differentials. See DIFFERENTIAL, and FLUXIONS.

Characters in Commerce.

D° *Ditto*, the same.
N° *Numero*, or number.
F° *Folio*, or page.
l. or *£. sterling*, Pound sterling.
s. Shillings.
d. Pence, or Deniers.
℔ Pound weight.
C. or ⊕ Hundred weight, or 112 pound.
qr Quarters.
℘ *Per*, or by. As ℘ *ann.* by the year. ℘ *cent.* in the hundred, &c.
P. S. Postscript.

Characters used in Music, and of Musical Notes with their Proportions, are as follow:

characters of a large	8	crotchet	$\frac{1}{4}$
a long	4	quaver	$\frac{1}{8}$
a breve	2	semiquaver	$\frac{1}{16}$
a semibreve	1	demisemiquaver	$\frac{1}{32}$
a minim	$\frac{1}{2}$		

✱ character of a sharp note: this character at the beginning of a line or space, denotes that all the notes in that line are to be taken a semitone higher than in the natural series; and the same affects all the octaves above and below, though not marked: but when prefixed to any particular note, it shows that note alone to be taken a semitone higher than it would be without such character. ♭ or *b*, character of a flat note: this is the contrary to the other above; that is a semitone lower. ♮ character of a natural note: when in a line or series of artificial notes, marked at the beginning *b* or ✱, the natural note happens to be required, it is denoted by this character. character of the treble cliff. character of the mean cliff. bass cliff. $\frac{2}{4}$ or $\frac{4}{8}$ characters of common duple time, signifying the measure of two crotchets to be equal to two notes, of which four make a semibreve. , characters that distinguish the movements of common time, the first implying slow, the second quick, and the third very quick. $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{16}$, characters of simple triple time, the measure of which is equal to three semibreves, or to three minims. $\frac{4}{8}$, $\frac{6}{8}$, or $\frac{6}{16}$, characters of a mixed triple time, where the measure is equal to six crotchets, or six quavers. $\frac{9}{4}$, or $\frac{9}{8}$, or $\frac{9}{16}$, $\frac{9}{1}$, or $\frac{9}{2}$ characters of compound triple time. $\frac{4}{12}$, $\frac{8}{12}$, $\frac{12}{16}$, or $\frac{1}{12}$, or $\frac{2}{12}$, characters of that species of triple time called the measure of twelve times. See also BAR, DOT, GRACES, REST, &c.

Characters in Grammar, Rhetoric, Poetry, &c.

( ) parenthesis	¨ dialysis
[ ] crotchet	^ caret and circumflex
- hyphen	" quotation
' apostrophe	† ‡ and * references
´ emphasis or accent	§ section or division
˘ breve	¶ paragraph

F.R.S fellow of the royal society
SS.T.D. or D.D. doctor of divinity
V.D.M. minister of the word of God
LL.D. doctor of laws
J.V.D. doctor of civil and canon law
M.D. doctor in physic
A.M. master of arts
A.B. bachelor of arts.

See COMMA, COLON, SEMICOLON, &c.

Characters in Medicine and Pharmacy.

℞ recipe
ā, āā, or ana, of each alike
℔ a pound or a pint
℥ an ounce
ʒ a drachm
℈ a scruple
gr. grains
P. a pugil
P.Æ. equal quantities
S.A according to art
q.s.a. sufficient quantity
ß, or *ss*, half of any thing
cong. congius, a gallon
coch. cochleare, a spoonful
M. manipulus, a handful
q. pl. as much as you please
P.P. pulvus patrum, the Jesuit's bark.

CHARACTERS, in chemistry. See CHEMISTRY.

CHARACTERS upon tomb-stones.
S.V. Siste viator, i. e. Stop, traveller
M.S. Memoriæ sacrum, *i. e.* Sacred to the memory.

CHARACTER (Literal), is a letter of the alphabet, serving to indicate some articulate sound, expressive of some idea or conception of the mind. See ALPHABET.

1. These may be divided, with regard to their nature and use, into nominal characters, or those we properly call letters; which serve to express the names of things. Real characters;

those that instead of names express things and ideas. Emblematical or symbolical characters; which have this in common with real ones, that they express the things themselves; but have this further, that they in some measure personate them, and exhibit their form: such are the hieroglyphics of the ancient Egyptians. See HIEROGLYPHIC, SYMBOL, &c.

2. Literal characters may be again divided, with regard to their invention and use, into particular and general or universal.

CHARACTERS (Particular), are those peculiar to this or that nation. Such are the Roman, Italic, Greek, Hebrew, Arabic, Gothic, Chinese, &c. characters. See HEBREW, GOTHIC, CHINESE, &c.

CHARACTERS (Universal), are also real characters, and make what some authors call a philosophical language. That diversity of characters used by the several nations to express the same idea, is found the chief obstacle to the advancement of learning: to remove this, several authors have taken occasion to propose plans of characters that should be universal, and which each people should read in their own language. The character here is to be real, not nominal: to express things and notions, not as the common ones, letters or sounds: yet to be mute, like letters, and arbitrary; not emblematical, like hieroglyphics.

Thus, every nation would retain its own language, yet every one understand that of each other, without learning it; only by seeing a real or universal character, which should signify the same things to all people, by what sounds soever each express it in their particular idiom. For instance, by seeing the character destined to signify *to drink*, an Englishman should read *to drink*; a Frenchman, *boire*; a Latin, *bibere*; a Greek, πινειν; a Jew, שתות; a German, *trincken*; and so of the rest: in the same manner as seeing a horse, each people express it after their own manner; but all mean the same animal.

This real character is no chimera; the Chinese and Japanese have already something like it. They have a common character which each of these nations understand alike in their several languages; though they pronounce them with such different sounds that they do not understand one another in speaking. The first and most considerable attempts for a real character, or philosophical language, in Europe, are those of bishop Wilkins and Dalgarme: but these, with how much art soever they were contrived, have yet proved ineffectual. M. Leibnitz had some conceptions the same way; he thinks those great men did not hit the right method. It was probable, indeed, that by their means, people, who do not understand one another, might easily have a commerce together; but they have not hit on true real characters. According to him, the characters should resemble those used in algebra; which, in effect, are very simple, yet very expressive; without any thing superfluous or equivocal, and contain all the varieties required.

The real character of bishop Wilkins has its just applause: Dr. Hook recommends it on his own knowledge and experience as a most excellent scheme; and to engage the world to the study thereof, publishes some fine inventions of his own by way of addition.

M. Leibnitz tells us, he had under consideration an alphabet of human thoughts, in order to a new philosophical language on his own scheme: but his death prevented its being brought to maturity.

M. Lodwic, in the Philosophical Transactions, gives us a plan of an universal alphabet or character of another kind: this was to contain an enumeration of all such single sounds, or letters, as are used in any language; by means whereof people should be enabled to pronounce truly and readily any language; to describe the pronunciation of any language that shall be pronounced in their hearing, so as others accustomed to this language, though they had never heard the language pronounced, shall at first be able truly to pronounce it: and lastly, this character to serve as a standard to perpetuate the sounds of any language. In the Journal Literaire, for 1720, we have a very ingenious project for an universal character. The author, after obviating the objections that might be made against the feasibleness of such schemes in the general, proposes his own: his characters are to be the common Arabic, or numeral figures. The combinations of these nine are sufficient to express distinctly an incredible quantity of numbers, much more than we shall need terms to signify our actions, qualities, duties, passions, &c. Thus is all the trouble of framing and learning any new character at once saved; the Arabic figures having already all the universality required.

The advantages are immense. For, 1. We have here a stable, faithful interpreter; never to be corrupted or changed, as the popular languages continually are. 2. Whereas the difficulty of pronouncing a foreign language is such as usually gives the learner the greatest trouble, and there are even some sounds to which foreigners never attain. In the character here proposed, this difficulty has no place: every nation is to pronounce them according to the particular pronunciation that already obtains among them. All the difficulty is, the accustoming the pen and the eye to affix certain notions to characters that do not, at first sight, exhibit them. But this trouble is no more than we find in the study of any language whatever.

The inflections of words are here to be expressed by the common letters. For instance, the same character shall express a filly or a colt, a horse or a mare, an old horse or an old mare, as accompanied with this or that distinctive letter, which shall shew the sex, youth, maturity, or old age: a letter also to express the bigness or size of things: thus, v. g. a man with this or that letter, to signify a great man, or a little man, &c. The use of these letters belongs to the grammar; which, once well understood, would abridge the vocabulary exceedingly. An advantage of this grammar is,

that it would only have one declension and one conjugation: those numerous anomalies of grammarians are exceeding troublesome, and hence it is, that the common languages are governed by the populace, who never reason on what is best: but in the character here proposed, men of sense having the introduction of it, would have a new ground, whereon to build regularly. But the difficulty is not in inventing the most simple, easy, and commodious character, but in engaging the several nations to use it, there being nothing they agree less in than the understanding and pursuing their common interest.

3. Literal characters may again be divided, with respect to the nations among whom they have been invented, into Greek characters, Roman characters, Hebrew characters, &c. The Latin character now used through all Europe was formed from the Greek, as the Greek was from the Phœnician; and the Phœnician, as well as the Chaldee, Syriac, and Arabic characters, were formed from the ancient Hebrew, which subsisted till the Babylonish captivity: for after that event the character of the Assyrians, which is the square Hebrew now in use, prevailed, the ancient being only found on some Hebrew medals commonly called Samaritan medals. It was in 1091 that the Gothic characters, invented by Ulfias, were abolished, and the Latin ones established in their room.

Character, in law, if a person apply to another for the character of a third person, and a good character as to his solvency be given, yet if, in consequence of this opinion, the party asking the question suffer loss through the person's insolvency, no action lies against him who gave the character, if it were fairly given. But if a man assert what he knows to be false, and thereby draws his neighbour into a loss, it is actionable. Yet if the party giving credit also knew that the party credited was in bad circumstances, an action will not lie.

Character, in poetry, particularly the epopee and drama, is the result of the manners or peculiarities by which each person is distinguished from others.

The poetical character, says Mr. Bossu, is not properly any particular virtue or quality, but a composition of several which are mixed together, in a different degree, according to the necessity of the fable and the unity of the action: there must be one, however, to reign over all the rest; and this must be found, in some degree, in every part. The first quality in Achilles, is wrath; in Ulysses, dissimulation; and in Æneas, mildness: but as these characters cannot be alone, they must be accompanied with others to embellish them, as far as they are capable, either by hiding their defects, as in the anger of Achilles, which is palliated by extraordinary valour; or by making them centre in some solid virtue, as in Ulysses, whose dissimulation makes a part of his prudence; and in Æneas, whose mildness is employed in a submission to the will of the gods. In the making up of this union, it is to be observed, the poets have joined together such qualities as are by nature the most compatible; valour with anger, piety with mildness, and prudence with dissimulation. The fable required prudence in Ulysses, and piety in Æneas; in this therefore the poets were not left to their choice: but Homer might have made Achilles a coward, without abating any thing from the justness of his fable: so that it was the necessity of adorning his character that obliged him to make him valiant. The character then of a hero in an epic poem is compounded of three sorts of qualities; the first, essential to the fable; the second, an embellishment of the first; and valour, which sustains the other two, makes the third.

Unity of character is as necessary as the unity of the fable. For this purpose a person should be the same from the beginning to the end; not that he is always to betray the same sentiments, or one passion, but that he should never speak or act inconsistently with his fundamental character. For instance, the weak may sally into a warmth, and the breast of the passionate be calm, a change which often introduces in the drama a very affecting variety; but if the natural disposition of the former was to be represented as boisterous, and that of the latter mild and soft, they would both act out of character, and contradict probability.

True characters are such as we truly and really see in men, or may exist without any contradiction to nature. No man questions but there have been men as generous and as good as Æneas, as passionate and as violent as Achilles, as prudent and wise as Ulysses, as impious and atheistical as Mezentius, and as amorous and passionate as Dido; all these characters, therefore, are true, and nothing but just imitations of nature. On the contrary, a character is false when an author so feigns it, that one can see nothing like it in the order of nature wherein he designs it shall stand; and such should be wholly excluded from a poem, because, transgressing the bounds of probability and reason, they meet with no belief from the readers; they are fictions of the poet's brain, not imitations of nature.

CHARACTERI′STICAL. Characteri′stic. *a.* (from *characterize.*) That constitutes the character (*Dryden. Woodward*).

Characteristic, in grammar, denotes the principal letter of a word; which is preserved in most of its tenses and moods, its derivatives and compounds.

Characteristic of a logarithm, is its index or exponent.

Characteristic triangle of a curve. See Curve.

CHARACTERI′STICALNESS. *s.* The quality of being peculiar to a character.

CHARACTERI′STICK. *s.* That which constitutes the character (*Pope*).

To CHARA′CTERIZE. *v. a.* (from *character.*) 1. To give a character or an account of the personal qualities of any man (*Swift*). 2. To engrave; to imprint (*Hale*). 3. To mark with a particular stamp or token (*Arbuthnot*).

CHA'RACTERLESS. *a.* (from *character.*) Without a character (*Shakspeare*).

CHA'RACTERY. *s.* (from *character.*) Impression; mark; distinction (*Shakspeare*).

CHARADE, is the name of a modern species of enigmatical composition. It owes its name to the Idler who invented it. Its subject must be a word of two or more syllables, each forming a distinct word; and these syllables are to be concealed in an enigmatical description, first separately, and then together. As the exercise of charade may serve to try the inventive talents of young persons, we hold ourselves justified in presenting half a dozen specimens.

1. My *first*, however here abused,
Designs the sex alone;
In Cambria, such is custom's pow'r,
'Tis Jenkin, John, or Joan.
My *second* oft is loudly call'd,
When men prepare to fist it:
It's name delights the female ear;
Its force, may none resist it!
It binds the weak, it binds the strong,
The wealthy, and the poor;
Still 'tis to joy a passport deem'd,
For sullied fame a cure:
It may insure an age of bliss,
Yet mis'ries oft attend it;
To fingers, ears, and noses too,
Its various lords commend it.
My *whole* may chance to make one drink,
Though vended in a fish-shop;
'Tis now the monarch of the seas,
And has been an archbishop. *Her-ring.*

2. My *first* is plowed for various reasons, and grain is frequently buried in it to little purpose. My *second*, is neither riches nor honours; yet the former would generally be given for it, and the latter is often tasteless without it. My *whole* applies equally to spring, and summer, autumn, and winter; and both fish and flesh, praise and censure, mirth and melancholy, are the better for being in it. *Sea-son.*

3. My *first*, with the most rooted antipathy to a Frenchman, prides himself, whenever they meet, upon sticking close to his jacket. My *second* has many virtues, nor is it its least that it gives name to my first. My *whole*, may I never catch! *Tar-tar.*

4. My *first* is one of England's prime boasts; it rejoices the ear of a horse, and anguishes the toe of a man. My *second*, when brick, is good; when stone, better; when *wooden*, best of all. My *whole* is famous alike for rottenness and tin. *Corn-wall.*

5. My *first* is called bad or good,
May pleasure or offend ye;
My *second*, in a thirsty mood,
May very much befriend ye.
My *whole*, tho' styled "a cruel word,"
May yet appear a kind one;
It often may with joy be heard,
With tears may often blind one.
Fare-well.

6. My *first* is equally friendly to the thief and the lover, the toper and the student. My *second* is light's opposite: yet they are frequently seen hand in hand; and their union, if judicious, gives much pleasure. My *whole*, is tempting to the touch, grateful to the sight, fatal to the taste. *Night-shade.*

CHARADRIUS. Plover. In zoology, a genus of the class aves, order grallæ. Bill roundish, obtuse, straight; nostrils linear; feet formed for running, three-toed. Thirty three species; chiefly inhabitants of Europe and America; of which some are gregarious and some solitary; we can only select the following:

1. C. hiaticula. Ringed plover. Breast black; front blackish, with a white band; crown brown; legs yellow; bill the upper half orange, the lower black; irids hazel; eggs bluish white, with small, round, purplish spots. Inhabits Europe and America; from six to seven inches long; frequents the shores of England early in the spring, and migrates in autumn: another variety is found in Spain; grey in colour, with white collar and belly: and a third in America, of an ash-grey hue; front and collar white; lower half of the tail tipt black with rusty.

2. C. morinellus. Dotterel. Breast ferruginous; band over the eyes and line on the breast white; legs black. Another variety; in which the crown is varied with white, grey-brown and yellowish; body beneath, yellowish mixed with white: two middle tail-feathers brown, the lateral ones white. Inhabits Europe; from nine to ten inches long: proverbial for its stupidity.

3. C. pluvialis. Golden plover. Body blackish, spotted with yellowish-green; beneath whitish; legs blackish. Inhabits almost every where in England during winter on heaths and moors, and a common object of sport; breeds on unfrequented mountains, and makes a whistling noise. Eggs dirty-white; irregularly spotted with purple. Another variety; with body blackish, varied with yellowish, beneath white, lower part of the neck and breast pale grey, found in St. Domingo.

4. C. calidus. Sanderling. Curwillet. Bill and legs black; lores and rump greyish; body beneath white without spots. Another variety with body cinereous varied with brown; wing-coverts black, edged with cinereous; the greater, cinereous edged with white: quill-feathers and tail dusky. Inhabits the sandy shores of Europe and America. See Nat. Hist. Plate VIII.

CHARBON, in the manage, that little black spot, or mark, that remains after a large spot, in the cavity of the corner teeth of a horse.

CHARCOAL is the black residue of vegetable matters, whose volatile principles have been dissipated by heat. None but organic matters, containing a greater or less proportion of oil, afford charcoal. The production of this substance was formerly ascribed to the decomposition of the oil, but it is now generally under-

stood that the carbonaceous matter exists ready formed in the vegetable, and that which is accomplished by the operation of fire is only the separation of the volatile particles that were united with it. Charcoal is generally black, brittle, and sonorous. Different vegetable matters afford it in greater or less abundance, according to the solidity and the form of their texture: wood yields more than herbs, gums more than resins, and resins more than fluid oils. In the common mode of making charcoal in the great way, its physical properties are observed to be different, according to the nature and the state of the vegetables from which it is formed: it is sometimes hard, and retains, in some degree, the organization of the vegetable; at other times it is friable, and sometimes pulverulent: pure oils afford a coal in very fine and seemingly levigated molecules called lamp-black; its gravity also varies in like manner. Its colour is also subject to variety, being either of a lighter or a deeper, a sparkling or a dull colour. Although every sort of charcoal is inflammable, yet the different kinds are not equally so; and this distinction is the most useful to the arts of all the facts relating to this substance. Some sorts of it burn readily with flame and are quickly consumed; others are difficult to kindle, burn but slowly, and remain for a long time red-hot, before they are reduced to ashes. It is to be remarked, however, that when wood is charred in closed iron cylinders, as in the 2d process described below, the charcoal appears to be possessed of the same qualities, from whatever kind of wood it is made. Charcoal is prepared by two methods:

1. By burning in the open air, which is generally performed in heaps or piles of the wood intended to be charred, and, for the sake of convenience, either in or near the woods where the trees are felled. The summer months are best adapted to this purpose. When the wood is sufficiently dry, and has been sawn and split into pieces of the proper size, it is piled up into large conical or pyramidal heaps, from twenty to thirty feet in diameter, and intermixed with brushwood for the purpose of kindling and burning it. A cylindrical hollow is sometimes left in the centre for the purpose of introducing lighted chips. The other parts of the heap are coated with turf, or a mixture of earth and charcoal dust, and when the kindling is quite completed, the top is also covered. A row of holes is then opened in the base of the pile, if there be none left in constructing it, for the admission of air, and the escape of the smoke and vapours; and others are opened, as these become useless, until the burning is carried to the top of the heap, when the whole is covered up as completely as possible till the fire is entirely extinguished. Those pieces that are found not to be sufficiently charred are called brands, and are employed as fuel for the next fire. If the process be well managed, and under favourable circumstances, the coals will exactly retain the figure of the pieces of wood of which they were formed. In the forest of Benon, near Rochelle, in France, where charcoal of a very superior quality is fabricated, the operation is carried on in an inclosed place or chamber, about 20 feet square, surrounded with walls to the height of 15 feet, and covered with planks and tiles, arranged in such a manner, that between the planks a space of two inches is left for the admission of air, and the passage of smoke. The wood is not split, being cut from oak trees not exceeding 6 inches in diameter. The pieces, which are about 4 feet in length, are placed upright, resting, with the side cut into a slope like the mouth of a flute, upon a convex mass of earth, and in such a manner that they all touch each other, those at the circumference only being a little inclined. Contrary to general practice, only one story is formed at Benon. Care is taken to mix these billets with small branches; but twigs are never introduced, except in the central aperture called the furnace, merely for the purpose of kindling. Fire is applied by means of a stick introduced by a passage left at the lower part of the furnace. The crevices are stopped as soon as they appear, and the usual practice is followed in this respect that the fire may be perfectly regular. The use of the surrounding walls is to render the operation more uniform and perfect, by checking the current of the inferior air, while a sufficient quantity for combustion is admitted at top. When the wood is charred, water is thrown over it; and then it is covered to the height of 5 or 6 inches with earth. It is suffered to cool for a day, and the charcoal is taken out. The operation lasts eight days in winter; but in summer only four; requiring then to be watched day and night. The pieces of charcoal thus formed are often sufficiently long to be made up into bundles and carried on the backs of mules: the smaller fragments are put into sacks. It is very black, exceedingly brilliant, and sonorous; and preferred in France above that manufactured in any other manner.

2d method. By distillation, which is a material improvement in the art of preparing the finer charcoal. For this purpose a large cylinder of cast iron fixed in masonry over a grate, and furnished at one end with a door, and terminating at the other in a curved pipe, is filled with the chips of any kind of wood; the door being then closed, and a fire lighted in the grate, the volatile parts of the wood are driven off by the heat, which is increased till the cylinder and its contents are red-hot. The fire is then withdrawn, the cylinder is allowed to cool, and a black, shining, and remarkably pure charcoal is procured, admirably fitted for the use of gunpowder-makers, and apparently possessed of the same qualities from whatever kind of wood it is made.

Mr. Mushet, of the Calder iron-works, has made experiments with a view of ascertaining the proportion of charcoal yielded by different kinds of wood: the results of his experiments are contained in the following table.

	100 parts of	
Lignum vitæ	26·85	of a greyish colour resembling coke.
Mahogany	25·49	tinged with brown, spongy, and porous.
Laburnum	24·58	velvet black, compact, very hard
Chesnut	23·28	glossy black, compact and firm.
Oak	22·68	black, close, and very firm
American black-beach	21·45	fine black, compact, and remarkably hard.
Walnut	20·66	dull black, texture close, body firm.
Beech	19·94	ditto, spongy, firm.
Holly	afforded 19·92 of charcoal	ditto, loose and bulky.
American maple	19·90	ditto, close, moderately firm.
Sycamore	19·73	fine black, bulky, and ditto.
Elm	19·57	ditto, - - - ditto.
Norway pine	19·20	shining black, bulky, and very soft.
Sallow	18·49	velvet black, bulky, loose and soft.
Ash	17·97	shining black, spongy, moderately firm.
Birch	17·49	velvet black, bulky, ditto.
Scotch pine	16·45	tinged with brown, bulky, ditto.

In selecting these articles from Mr. Mushet's paper in the Philosophical Magazine, we have arranged the woods according to the proportions of charcoal they afford: the third place of decimals is neglected, as of little consequence in the comparison. See Phil. Mag. vol. iii. p. 17.

As we have noticed the principal chemical properties of this substance under the word Carbon, we shall refer to that article, and proceed to mention the chief uses of charcoal in the arts.

Formerly, and indeed so lately as the beginning of the 17th century, vast and almost incredible quantities were used in the blast-furnaces, of which there were in Britain about the year 1615 not less than 300, for smelting iron ore. The annual produce, according to Dudley, may be averaged at 180,000 tons of crude iron, for procuring which 144,000 tons of charcoal were necessary, requiring not less than 17,310,000 cubical feet of timber to form it. The same author informs us that for refining the crude iron, and making it into malleable bars, a further quantity of 90,000 tons of charcoal would be requisite = 10,732,000 cubical feet, so that the enormous quantity of 28,062,000 solid feet of timber would be consumed in a year in the iron-works only. As timber became scarce, however, pit-coal was resorted to, and that article is now principally used for the smelting and refining of iron.

Besides the use of charcoal in making gunpowder, and for fuel on many occasions where heat is wanted devoid of smoke, mathematical instrument-makers, engravers, &c. find it of great service to polish their brass and copper plates after they have been rubbed clean with powdered pumice-stone. Mr. Boyle says that the more curious burn it a second time, and quench it in a convenient fluid. Charcoal and soot-black are employed as durable and useful blacks by the painter and the varnish maker. Those of the former kind are used both as pigments and pencils, and charcoal crayons prepared from the willow are preferred on account of their softness. Charcoal was anciently used to distinguish the bounds of estates and inheritances: as being supposed incorruptible in the ground. The dust and ashes of charcoal are found to be of very great benefit to many kinds of land as a manure, or as a dressing to lighten the soil. Pieces of charcoal will sometimes afford sparks by collision; and Leschevin and Lemaitre have ascribed to this cause the explosions which have taken place in the gunpowder manufactories of France: but probably without sufficient reason, as explosions continue to happen where the charcoal is pulverised before it reaches the manufactory, which is generally the practice in England. From the antiseptic property of charcoal, its powder has been recommended for the purpose of filtering and purifying corrupt water, and of preserving animal matter; charred casks have been employed for keeping water pure on shipboard; and, of late years, charcoal has been highly and deservedly extolled as a dentifrice.

Many curious observations and experiments on this substance, its uses in metallurgy, and its various combinations, are detailed in several volumes of the Phil. Mag. particularly vols. xiii. and xiv.; in Nicholson's 4to Journal; and in the Repertory of Arts.

CHARD. *s.* (*charde*, French.) 1. Chards of artichokes are the leaves of fair artichoke plants, tied and wrapped up all over but the top, in straw (*Chambers*). 2. Chards of beet, are plants of white beet transplanted (*Mort.*).

Chard, a town in Somersetshire, with a market on Mondays. Lat. 50. 52 N. Lon. 3. 18 W.

CHARDON, in botany. See Cynara.

CHARENTE, a department of France, including the late province of Angoumois.

Charente (Lower), a department of France, consisting of the two late provinces of Aunis and Saintonge.

To CHARGE. *v. a.* (*charger*, French.) 1. To entrust; to commission for a certain purpose (*Shakspeare*). 2. To impute as a debt (*Locke*). 3. To impute as a crime (*Watts*). 4. To impose as a task (*Tillotson*). 5. To accuse; to censure (*Wake*). 6. To challenge (*Shakspeare*). 7. To command; to enjoin (*Dryden*). 8. To fall upon; to attack (*Shak.*).

9. To burden; to load (*Temple*). 10. To fill (*Addison*). 11. To load a gun.

CHARGE. *s.* (from the verb.) 1. Care; custody; trust to defend (*Knolles*). 2. Precept; mandate; command (*Hooker*). 3. Commission; trust conferred; office (*Pope*). 4. Accusation; imputation (*Shak.*). 5. The person or thing entrusted to the care or management of another (*Milton*). 6. Expence; cost (*Dryd.*). 7. Onset; attack (*Bacon*). 8. The signal to fall upon enemies (*Dryden*). 9. A load; a burden (*Shak.*). 10. A sort of ointment, applied to the inflammations and sprains of horses (*Farrier's Dict.*). 11. (In heraldry.) That which is borne upon the colour, or escutcheon (*Peacham*).

There are two other senses of this word, too important to be passed over so cursorily.

CHARGE, in electricity, in a strict sense, imports the accumulation of the electric matter on one surface of an electric, as the Leyden phial, a pane of glass, &c. whilst an equal quantity passes off from the opposite surface. Or, more generally, electrics are said to be charged, when the equilibrium of the electric matter on the opposite surface is destroyed, by communicating one kind of electricity to one side, and the contrary kind to the opposite side: nor can the equilibrium be restored till a communication be made by means of conducting substances between the two opposite surfaces: and when this is done, the electric is said to be discharged. The charge properly refers to one side, in contradistinction from the other; since the whole quantity in the electric is the same before and after the operation of charging; and the operation cannot succeed, unless what is gained on one side is lost by the other, by means of conductors applied to it, and communicating either with the earth, or with a sufficient number of non-electrics.

CHARGE, in gunnery, the load of a piece of ordnance, or the quantity of powder and ball, or shot, with which it is prepared for execution.

The charge of powder, for proving guns, is equal to the weight of the ball; but for service, the charge is $\frac{1}{2}$ or $\frac{1}{3}$ the weight of the ball, or still less; and indeed in most cases of service, the quantity of powder used is too great for the intended execution. In the British navy the allowance for 32 pounders is but $\frac{7}{16}$ of the weight of the ball. But it is probable that, if the powder in all ship guns was reduced to $\frac{1}{3}$ the weight of the ball, or even less, it would be a considerable advantage, not only by saving ammunition, but by keeping the guns cooler and quieter, and at the same time more effectually injuring the vessels of the enemy. With the present allowance of powder, the guns are heated, and their tackle and furniture strained, and all this only to render the ball less efficacious: for a ball which can but just pass through a piece of timber, and in the passage loses almost all its motion, is found to rend and fracture it much more than when it passes through with a much greater velocity. See Robins's Tracts, vol. i. p. 290, 291.

Again, the same author observes, that the charge is not to be determined by the greatest velocity that may be produced; but that it should be such a quantity of powder as will produce the least velocity necessary for the purpose in view; and if the windage be moderate, no field-piece should ever be loaded with more than $\frac{1}{6}$, or at the utmost $\frac{1}{5}$ of the weight of its ball in powder; nor should the charge of any battering piece exceed $\frac{1}{3}$ of the weight of its bullet. Ib. pa. 266.

Different charges of powder, with the same weight of ball, produce different velocities in the ball, which are in the subduplicate ratio of the weights of powder; and when the weight of powder is the same, and the ball varied, the velocity produced is in the reciprocal subduplicate ratio of the weight of the ball; which is agreeable both to theory and practice. See Dr. Hutton's paper on gunpowder in the Philos. Trans. 1778, pa. 50; and Tracts, vol. 1. pa. 266.

But this is on a supposition that the gun is of an indefinite length; whereas, on account of the limited length of guns, there is some variation from this law in practice, as well as in theory; in consequence of which it appears that the velocity of the ball increases with the charge only to a certain point, which is peculiar to each gun, where the velocity is the greatest; and that by farther increasing the charge, the velocity gradually diminishes, till the bore is quite full of powder. By an easy fluxionary process it appears that, calling the length of the bore of the gun b, the length of the charge producing the greatest velocity ought to be $\frac{b}{2{\cdot}718281828}$, or about $\frac{3}{8}$ of the length of the bore; where 2·718281828 is the number whose hyp. log. is 1. But, for several reasons, in practice the length of the charge producing the greatest velocity, falls short of that above mentioned, and the more so as the gun is longer. From many experiments Dr. H. found the length of the charge producing the greatest velocity, in guns of various lengths of bore, from 15 to 40 calibres, as follows:

Length of bore in calibres.	Length of charge for greatest veloc.
15	$\frac{3}{10}$
20	$\frac{3}{12}$
30	$\frac{3}{16}$
40	$\frac{3}{20}$

(*Hutton's Dict.*)

CHA'RGEABLE. *a.* (from *charge.*) 1. Expensive; costly (*Wotton*). 2. Imputable, as a debt or crime (*South*). 3. Subject to charge; accusable (*Spectator*).

CHA'RGEABLENESS. *s.* (from *chargeable.*) Expence; cost; costliness (*Boyle*).

CHA'RGEABLY. *ad.* (from *chargeable.*) Expensively; at great cost (*Ascham*).

CHA'RGER. *s.* (from *charge.*) A large dish (*Denham*).

CHARGER, is sometimes used by old writers for the horse on which a knight rides when he makes the charge or attack upon his enemy.

CHA'RILY *ad.* (from *chary.*) Warily; frugally (*Shak.*).

CHA'RINESS. *s.* (from *chary.*) Caution; nicety; scrupulousness (*Shak.*).

CHAR'IOT, a half coach, having only a seat behind. (See COACH.) The chariots of the ancients, chiefly used in war, were called by the several names *bigæ*, *trigæ*, &c. according to the number of horses employed to draw them. Every chariot carried two men, who were probably the warrior and the charioteer; and we read of several men of note and valour employed in driving the chariot. When the warriors came to encounter in close fight, they alighted out of the chariot, and fought on foot; but when they were weary, which often happened by reason of their armour, they retired into their chariots, and thence annoyed their enemies with darts and missive weapons. These chariots were made so strong, that they lasted for several generations. But besides this sort, we find frequent mention of the *currus falcati*, or chariots armed with hooks, or scythes, with which whole ranks of soldiers were cut off together, if they had not the art of avoiding the danger; these were not only used by the Persians, Syrians, Egyptians, &c. but we find them among the ancient Britons; and notwithstanding the imperfect state of some of the most necessary arts among the latter before the invasion of the Romans, it is certain that they had war-chariots in great abundance. By the Greek and Roman historians, these chariots are described by the six following names: viz. benna, petoritum, currus, or carrus, covinus, essedum, and rheda.

To CHAR'IOT. *v. a.* (from the noun.) To convey in a chariot (*Milton*).

CHARIOTE'ER. *s.* (from *chariot.*) He that drives the chariot (*Prior*).

CHA'RIOT-RACE. *s.* A sport where chariots were driven for the prize (*Addison*).

CHARIS, a goddess among the Greeks, surrounded with pleasures, graces, and delight. She was the mistress of Vulcan. (*Homer.*)

CHARISIA, a festival in honour of the Graces, with dances which continued all night. He who continued awake the longest was rewarded with a cake.

CHARISTIA, a festival of the ancient Romans, celebrated in the month of February, wherein the relations, by blood and marriage, met, in order to preserve a good correspondence.

CHA'RITABLE. *a.* (*charitable*, French.) 1. Kind in giving alms (*Taylor*). 2. Kind in judging of others (*Bacon*).

CHA'RITABLY. *ad.* (from *charity.*) 1. Kindly; liberally. 2. Benevolently; without malignity (*Taylor*).

CHARITES & GRATIÆ, in mythology, the Graces, daughters of Venus, by Jupiter or Bacchus, are three in number, Aglaia, Thalia, and Euphrosyne. They were the constant attendants of Venus, and were represented as three young, beautiful, and modest virgins, all holding one another by the hand. They presided over kindness and all good offices, and their worship was the same as that of the nine Muses, with whom they had a temple in common. They were generally represented naked, because kindnesses ought to be done with sincerity and candor. The moderns explain the allegory of their holding their hands joined, by observing, that there ought to be a perpetual and never-ceasing intercourse of kindness and benevolence among friends.

CHA'RITY. *s.* (*charité*, French.) 1. Tenderness; kindness; love (*Milton*). 2. Good-will; benevolence (*Dryden*). 3. The theological virtue of universal love (*Att.*). 4. Liberality to the poor (*Dryden*). 5. Alms; relief given to the poor (*L'Estrange*).

CHARITY (Brothers of), a sort of religious hospitallers, founded about the year 1297, since denominated Billetins. They took the third order of St. Francis, and the scapulary, making three usual vows, but without begging. Brothers of charity also denote an order of hospitallers, still subsisting in Romish countries, whose business is to attend the sick poor, and minister to them both spiritual and temporal succour. They are all laymen, except a few priests, for administering the sacraments to the sick in their hospitals. They were first founded at Grenada, by St. John de Dieu; and a second establishment was made at Madrid in 1553. They were introduced into France in 1601.

CHARITY (Feasts of.) See AGAPÆ.

CHARITY OF OUR LADY, in church history, a religious order in France, which, though charity was the principal motive of their union, grew, in length of time, so disorderly and irregular, that their order dwindled, and, at last, became extinct.

CHARITY-SCHOOLS, are schools erected and maintained in various parishes, by the voluntary contributions of the inhabitants, for teaching poor children to read, write, and other necessary parts of education. In most charity-schools the children are likewise clothed, and put out to trades, services, &c. on the same charitable foundation.

To CHARK. *v. a.* To burn to a black cinder, as wood is burnt to make charcoal (*Grew*).

CHA'RLATAN. *s.* (*charlatan*, French.) A quack; a mountebank (*Brown*).

CHARLATA'NICAL. *a.* (from *charlatan.*) Quackish; ignorant (*Cowley*).

CHA'RLATANRY. *s.* (from *charlatan.*) Wheedling; deceit.

CHARLEMAGNE, or Charles the Great, king of France, and fourth emperor; born in 742. He was the son of Pepin, and succeeded his brother Carloman king of France. After defeating the Saxons, and putting an end to the monarchy of the Lombards, he was crowned emperor in 800. This great prince was not only a warrior, but an encourager of learning; and founded several universities. He died at Aix la Chapelle in 814. The reader who wishes for other particulars relative to Charlemagne may consult the histories of Gibbon, Hume, Du Fresnay, and the Modern Universal History.

CHARLEMONT, a borough of Ireland, in the county of Armagh. Lat. 54. 44 N. Lon. 6. 37 W.

CHARLEMONT, a fortified town of the Netherlands, in the province of Namur. Lat. 50. 6 N. Lon. 4. 40 E.

CHARLEROY, a strong town in the province of Namur, in the Austrian Netherlands. Lat. 50. 20 N. Lon. 4. 30 E.

CHARLES V. emperor and king of Spain, born at Ghent in 1500, came to the Spanish crown in 1516, and to that of the empire three months afterwards. Francis I. of France disputed with him the latter title, which occasioned a violent war in 1521. Charles made a league with Henry VIII. of England, and, after several important actions, took Francis prisoner at the battle of Pavia; he then conducted his royal captive to Madrid. A peace was at last concluded in 1535, and Charles then turned his arms against Africa, where he took Gouletta, vanquished Barbarossa, entered Tunis, re-established Muly-Hassan on the throne, and restored a great number of Christians to liberty. Soon after this he recommenced hostilities against France, and ravaged Champagne and Picardy, but was at length obliged to retire, and peace was once more established in 1538. In 1541 he attempted to conquer Algiers and was disappointed; he then leagued with England against France, but fortune was not so favourable to him as she had formerly been, and he was glad to enter into a treaty in 1545. The protestant princes of Germany confederated against him, and obtained liberty of conscience for those of their religion. The latter part of his life was not so brilliant as the beginning; his scheme of universal monarchy was frustrated, and none of the powers of Europe would trust him. In 1556 he resigned the crown to his son Philip, and went into the monastery of St. Juste, upon the borders of Castille, where he employed the remainder of his days in religious exercises and mechanical pursuits. He died in 1558. His character has been variously given by different historians. That he possessed great talents, however, cannot reasonably be doubted. He was deliberate in forming schemes, and prompt in their execution: his mind was formed for vigorous exertion; he acquired great knowledge in the art of war; and he possessed, in an eminent degree, the science of knowing men's characters: still, it must be confessed, that he had often recourse to low artifices, unbecoming his superior talents, and sometimes ventured on such deviations from integrity as were highly dishonourable.

CHARLES I. (Stuart) king of England. This unfortunate monarch was the second son of James I. He was born in November 1600, and succeeded his father in 1625: the same year he married Henrietta of France, the daughter of Henry IV. Two years after he sent assistance to the French king, who, it appeared, intended to make use of it against his protestant subjects in Rochelle; upon which the crews sent resolved to desert, rather than fight against their brother-protestants: the admiral (Pennington) was ordered to put these ships into the hands of the French, to be employed as they thought fit. This circumstance produced great dissatisfaction. Soon after this, the king engaging in several arbitrary measures to obtain that money which was refused him by the parliament, they began to be greatly incensed; and, at length, his majesty attempting to take several members out of the house of commons, while they were censuring his conduct, they rose into open rebellion, as the Scots had done some time before: this was followed by a bloody civil war, which lasted till the unhappy Charles was stripped of his dominions. He took refuge in Scotland; but the Scots were not long before they delivered him up to the English. He was at last brought to a trial before a high court of justice, a court whose jurisdiction he disowned; his judges construed his refusal to answer to the charges brought against him as an acknowledgment of his guilt: they therefore passed sentence of death upon him, and he was beheaded before the Banquetting-house at Whitehall, January 30, 1648, in the 49th year of his age, and the 25th of his reign. The rev. Philip Henry saw Charles beheaded, and he mentions one circumstance, which, as we do not recollect meeting with it in any history of the time, is here repeated. "Immediately after the dreadful stroke was struck, there was, according to order, one troop marching from Charing-cross towards King-street, and another from King-street towards Charing-cross, purposely to disperse and scatter the people, and to divert the dismal thoughts which they could not but be filled with, by driving them to shift every one for his own safety." Life of P. Henry, chap. ii.

The character of this prince, as that of all men, was mixed; but his virtues predominated exceedingly over his vices, or, more properly speaking, his imperfections. He was a man of polite taste, and a liberal encourager of literature and the arts. In his private life he was religious, an affectionate husband, and a tender father; so that let party opinion be what it may, he deserves to be admired as a man, though he cannot be freed from censure as a monarch. The characters drawn of him by Smollet and Hume are moderately favourable; and we should hope more correct than that given by Mrs. Macaulay, which allows "neither gratitude, clemency, humanity, equity, nor generosity," to have any place in it.

CHARLES II. king of England, eldest son of the preceding, and born in 1630. When his father was executed he was at the Hague, where he met with a generous reception from the States. The Scots, having had time to think, became ashamed of their treachery to the father, and by way of amends offered to acknowledge the son, who according went thither, and was crowned with much fanatical ceremony. However Cromwell defeated the Scotch at Dunbar, and when Charles went to Worcester, that enterprising general obtained a decisive victory over him there. His

escape after the battle was very singular, and the narrative of it is highly romantic. Hid in the thick branches of a large oak in Boscobel wood, he avoided his pursuers who came under the very tree where he was. Afterwards he went from one place to another in various disguises till he came to the sea-shore, and got safely out of the island. In 1660, by the management of general Monk, he was restored. The gloom, and severity, to which the nation had been used for so many years, gave way to pleasure and dissipation under a gay monarch, who had resided a considerable time in the politest court of Europe. A tide of licentiousness flowed into the kingdom, which carried before it the public morals and the public liberty. Charles was a man of wit and good-nature, so that his libertinism was excused, and his extravagance was forgiven, in consideration of his affability and humour. He died after having drained the kingdom of its treasure, and filled it with bastards, in 1684. On his death-bed, Charles sent for a Romish priest, professed himself a catholic, and received full absolution!

All historians admit that the good qualities of this monarch were more than overbalanced by his weakness and defects. "He was," says Smollet, "a scoffer at religion, and a libertine in his morals; careless, indolent, profuse, abandoned to effeminate pleasure, incapable of any noble enterprise, a stranger to any manly friendship and gratitude, deaf to the voice of honour, blind to the allurements of glory, and, in a word, wholly destitute of every active virtue. Being himself unprincipled, he believed mankind were false, perfidious, and interested; and therefore practised dissimulation for his own convenience." It has been said of this king, that he never said a foolish thing, nor ever did a wise one: "A censure," says Hume, "which, though too far carried, seems to have some foundation in his character and deportment."

Charles XII. king of Sweden. He was born in 1682, and from his childhood had an ambition to imitate Alexander the Great. He came to the throne at the age of 15, and at his coronation caught the crown from the hands of the archbishop of Upsal, and put it on his head himself. His youth presented a favourable opportunity to the sovereigns of Russia, Denmark, and Poland, to form a confederacy against him. The young hero, undaunted at so formidable an alliance, attacked each in turn, beginning with Denmark, which produced a peace with that power. In 1700 he obtained an astonishing victory over the Russians at Narva, and though his force consisted only of 8000, he attacked them in their entrenchments, slew 30,000, and 20,000 surrendered to the mercy of the conqueror. His next enterprise was against Poland, and after several battles he dethroned Augustus and placed Stanislaus upon the throne. Charles would have done prudently in contenting himself with the glory of these actions, after the peace of 1706; but a portion of madness seems to have entered into his character; and he formed the romantic resolution of humbling Peter the Great. He obtained some signal advantages at first, but at length he experienced a terrible defeat at Pultowa, in 1709. Almost all his troops were either slain or taken prisoners; he was wounded himself in the leg, and was carried off in a litter. Charles sought an asylum in Turkey, where he was well entertained by the grand seignior. The place of his residence was Bender, but after some time his behaviour was such that the Turks wanted to get rid of him; but Charles would not depart, and they were obliged to set his house on fire to force him to quit the place. From thence he removed to Demotika, where he remained ten months, and then went to Stralsund. On arriving in his own country he found it in a wretched condition, but he soon mustered an army and entered Norway. In 1718 he besieged Fredericshall, and was there killed by a cannon shot, December 11, of that year. This Alexander or Quixote of the north was liberal, active, and firm, but rash, obstinate, and cruel. He was never intimidated even in the midst of the greatest dangers. At the battle of Narva he had several horses shot under him, and as he was mounting upon a fresh one, he said, "These people find me exercise." While he was dictating letters to his secretary, a bomb fell through the roof of the house into the adjoining room; the secretary let drop the pen in a fright. "What is the matter?" said Charles. "Oh, the bomb!" answered he. "The bomb," says the king, "what have we to do with the bomb? go on." (*Watkins.*)—This prince experienced the extremes of prosperity and adversity, without being softened by the one, or disturbed for a moment at the other; but was a man rather extraordinary than great, and fitter to be admired than imitated. He was honoured by the Turks for his rigid abstinence from wine, and his regularity in attending public devotion. In religion he was a Lutheran, and a strong believer in predestination. He wrote some observations on war, and on his own campaigns from 1700 to 1709; but the MS. was lost at the unfortunate battle of Pultowa. The history of the life of this monarch, by Voltaire, may be consulted by those who wish to know more of his character and exploits.

Many other kings and emperors of the name Charles are mentioned by historians; but the preceding are all who seemed of sufficient importance to occupy our attention here.

Charles's cape, a promontory of Virginia. Lat. 37. 12 N. Lon. 75. 50 W. There is another cape of the same name, on the S.W. part of the strait entering Hudson's bay. Lat. 62. 10 N. Lon. 75. 15 W.

Charles's wain, in astronomy, a name given to seven stars marked α, β, γ, δ, ϵ, ι, and η, in Ursa major. These appear to have altered in relative brightness, since they were marked by Bayer. The figure is also called David's chariot, the plough, the butcher's cleaver, &c. Two of the stars, commonly called the pointers, are very useful in directing to the north

pole star, which always lies nearly in the same right line with them, and at about 5 times their apparent distance.

CHARLESTOWN, a town in the United States of America, in South Carolina, situated on a neck of land, at the conflux of the rivers Ashley and Cooper, both of which are large and navigable; the Ashley river for ships of tolerable burden twenty miles above the town, and for boats and canoes near forty. The navigation for ships in Cooper's river does not extend so far, but boats may advance farther. The union of these rivers below the town forms a convenient and spacious harbour, at a distance of about seven miles from the sea. The town is regularly built and was fortified before the American war, as well by art as nature. The situation is flat and low, and the water brackish; but the country round is agreeable and fruitful; the streets are well laid out, extending east and west from river to river, these are intersected by others, so that the town is formed into a number of squares. The houses built at first were of wood, those more lately erected of brick. The public buildings of Charlestown are an exchange, town-house, and armory; two churches for episcopalians, two for independents, with other places of worship for French Protestants, Methodists, Roman Catholics, Presbyterians, Quakers, and Jews. Charlestown is a place of good trade, and in 1791 contained 16,359 inhabitants. Lat. 32. 50 N. Lon. 80. 15 W.

CHARLESTON, is also the name of a town in the state of Rhode Island, and county of Washington. There are others of the same name in the states of Massachusets and New Hampshire.

CHARLEVILLE, a handsome town of France, in the department of Ardennes. Lat. 49. 50 N. Lon. 4. 45 E.

CHARLOCK, in botany. See SINAPIS.

CHARLOCK (White-flowered). See RAPHANUS.

CHARLOTTE'S ISLAND (Queen), an island in the S. Pacific ocean, 6 miles long, and one broad, discovered by captain Wallis, in 1767. Lat 19. 18 S. Lon. 138. 4 W.

CHARLOTTE'S ISLANDS (Queen), a cluster of South sea islands, discovered by captain Carteret, in 1767. He counted 7; but supposed there were more of them. They lie in about Lat. 11 S. Lon. 177 W.

CHARM. *s.* (*charme*, Fr. *carmen*, Lat.) 1. Words, or philtres, or characters, imagined to have some occult power (*Swift.*) 2. Something of power to subdue opposition, and gain the affections (*Waller*).

To CHARM. *v. a.* (from the noun.) 1. To fortify with charms against evil (*Shakspeare*). 2. To make powerful by charms. 3. To summon by incantation *Shakspeare*). 4. To subdue by some secret power (*Pope*). 5. To subdue by pleasure (*Waller*).

CHA'RMED. *a.* Enchanted (*Sidney*).

CHA'RMER. *s.* (from *charm.*) 1. One that has the power of charms, or enchantments (*Dry.*). 2. Word of endearment among lovers.

CHA'RMING. *particip. a.* (from *charm.*) Pleasing in the highest degree (*Sprat*).

CHA'RMINGLY. *ad.* In such a manner as to please exceedingly (*Addison*).

CHA'RMINGNESS. *s.* (from *charming.*) The power of pleasing.

CHA'RNEL. *a.* (*charnel*, French.) Containing flesh or carcases (*Milton*).

CHA'RNELHOUSE. *s.* (*charnier*, Fr.) The place where the bones of the dead are reposited (*Taylor*).

CHARNOCK (Stephen), a learned English divine, was born in London, and educated at Oxford, where he obtained a fellowship, and soon afterwards a living. He was one of the many excellent divines who were ejected for nonconformity: he preached privately till his death, which happened in 1680. His works were printed in 2 vols. folio: of these the piece on Providence is very highly and deservedly esteemed.

CHARON, in mythology, a god of hell, son of Erebus and Nox, who conducted the souls of the dead in a boat over the river Styx and Acheron, to the infernal regions, for an obolus placed under the tongue of the deceased. Such as had not been honoured with a funeral were not permitted to enter his boat, without previously wandering on the shore for one hundred years. If any living person presented himself to cross the Stygian lake, he could not be admitted before he showed Charon a golden bough as a passport, which he received from the Sybil. Charon is represented as an old robust man, with an hideous countenance, long white beard, and piercing eyes. His garment is ragged and filthy, and his forehead is covered with wrinkles. Virgil's description, in the 6th book of the Æneid, is as follows:

——There Charon stands, who rules the dreary coasts:
A sordid god: down from his hoary chin
A length of beard descends, uncomb'd, unclean;
His eyes like hollow furnaces on fire;
A girdle, foul with grease, binds his obscene attire.
He spreads his canvas, with his pole he steers,
The freights of flitting ghosts in his thin bottom bears.
He look'd in years; yet in his years were seen
A youthful vigour, and autumnal green.

CHARONIUM, a cave near Nysa, where the sick were supposed to be delivered from their disorders by certain superstitious solemnities.

CHARR, in ichthyology. See SALMO.

CHARRING OF POSTS, in rural economy, the practice of reducing that part of the surface of posts which is to be put into the ground, to somewhat of the state of charcoal, so as to render it more durable.

CHARRON (Peter), the author of a book intitled, Of Wisdom, which gained him great reputation, was born at Paris in the year 1541.

After being advocate in the parliament of Paris for five or six years, he applied himself to divinity; and became so great a preacher, that the bishops of several dioceses offered him the highest dignities in their gift. He died at Paris, suddenly in the street, November 16, 1603.

CHART, or SEA-CHART, a hydrographical or sea-map, for the use of navigators; being a projection of some part of the sea in plano, shewing the sea coasts, rocks, sands, bearings, &c. Fournier ascribes the invention of sea-charts to Henry son of John king of Portugal. These charts are of various kinds, the plain chart, Mercator's or Wright's chart, the globular chart, &c.

In the construction of charts, great care should be taken that the several parts of them preserve their position to one another, in the same order as on the earth; and it is probable that the finding out of proper methods to do this gave rise to the various modes of projection.

There are many ways of constructing maps and charts; but they depend chiefly on two principles. First, by considering the earth as a large extended flat surface; and the charts made on this supposition are usually called plain charts. Secondly, by considering the earth as a sphere; and the charts made on this principle are sometimes called globular charts, or Mercator's charts, or reduced charts, or projected charts.

Plain charts have the meridians, as well as the parallels of latitude, drawn parallel to each other, and the degrees of longitude and latitude everywhere equal to those at the equator. And therefore such charts must be deficient in several respects. For, 1st, since in reality all the meridians meet in the poles, it is absurd to represent them, especially in large charts, by parallel right lines. 2dly, As plain charts shew the degrees of the several parallels as equal to those of the equator, therefore the distances of places lying east and west must be represented much larger than they really are. And 3dly, In a plain chart, while the same rhumb is kept, the vessel appears to sail on a great circle, which is not really the case. Yet plain charts made for a small extent, as a few degrees in length and breadth, may be tolerably exact, especially for any part within the torrid zone; and even a plain chart made for the whole of this zone will differ but little from the truth.

Mercator's chart, like the plain charts, has the meridians represented by parallel right lines, and the degrees of the parallels, or longitude, everywhere equal to those at the equator, so that they are increased more and more, above their natural size, as they approach towards the pole; but then the degrees of the meridians, or of latitude, are increased in the same proportion at the same part; so that the same proportion is preserved between them as on the globe itself. This chart has its name from that of the author, Girard Mercator, who first proposed it for use in the year 1556, and made the first charts of this kind; though they were not altogether on true or exact principles, nor does it appear that he perfectly understood them. Neither indeed was the thought originally his own, we mean, the thought of lengthening the degrees of the meridian in some proportion; for that was hinted by Ptolemy near two thousand years ago. It was not perfected, however, till Mr. Wright first demonstrated it about the year 1590, and shewed a ready way of constructing it, by enlarging the meridian line by the continual addition of the secants. See his Correction of Errors in Navigation, published in 1599.

Globular chart, is a projection so called from the conformity it bears to the globe itself; and was proposed by Messrs. Senex, Wilson, and Harris. This is a meridional projection, in which the parallels are equidistant circles, having the pole for their common centre, and the meridians curvilinear and inclined, so as all to meet in the pole, or common centre of the parallels. By which means the several parts of the earth have their proper proportion of magnitude, distance, and situation, nearly the same as on the globe itself; which renders it a good method for geographical maps.

Hydrographical charts, are sheets of large paper, on which several parts of the land and sea are described, with their respective coasts, harbours, sounds, flats, rocks, shelves, sands, &c., also the points of the compass, and the latitudes and longitudes of the places.

Selonographic charts, are particular descriptions of the appearances, spots, and maculæ of the moon.

Topographic charts, are draughts of some small parts only of the earth, or of some particular place, without regard to its relative situation, as London, York, &c.

For the construction of charts, see GEOGRAPHY, MAPS, PROJECTION, &c.

CHARTA, or CARTA, primarily signifies a sort of paper made of the plant papyrus or biblus. Hence charta emporetica, a soft, porous paper used for filtering tinctures through. In our ancient customs this word denotes a deed in writing. See CHARTER.

CHARTA (Magna), the great charter of the liberties of Britain, and the basis of our laws and privileges, granted in the 9th year of Henry III., and confirmed by Edward I. eleven times in the course of his reign.

This charter confirmed many liberties of the church, and redressed many grievances incident to feodal tenures, of no small moment at that time; though now they may seem but of trifling concern. But, besides these feodal provisions, care was also taken therein to protect the subject against other oppressions, from unreasonable amercements, from illegal distresses, or other process for debts or services due to the crown, and from the tyrannical use of the prerogative of purveyance and pre-emption. It fixed the forfeiture of lands for felony in the same manner as it still remains; prohibited for the future the grants of exclusive fisheries; and the erection of new bridges so as to oppress the neighbourhood. With respect to private rights, it established the testamentary power of

the subject over part of his personal estate, the rest being distributed among his wife and children; it laid down the law of dower, as it has continued ever since; and prohibited the appeals of women, unless after the death of their husbands. In matters of public police and national concern, it enjoined an uniformity of weights and measures; gave new encouragements to commerce, by the protection of merchant-strangers; and forbad the alienation of lands in mortmain. With regard to the administration of justice, besides prohibiting all denials or delays of it, it fixed the court of Common Pleas at Westminster, that the suitors might no longer be harassed with following the king's person in all his progresses; and at the same time brought the trial of issues home to the very doors of the freeholders, by directing assizes to be taken in the proper counties, and establishing annual circuits: it also corrected some abuses then incident to the trials by wager of law and of battle; directed the regular awarding of inquests for life or member; prohibited the king's inferior ministers from holding pleas of the crown, or trying any criminal charge, whereby many forfeitures might otherwise have unjustly accrued to the exchequer; and regulated the time and place of holding the inferior tribunals of justice, the county-court, court-leet, &c. It confirmed and established the liberties of the city of London, and all other cities, boroughs, towns, and ports of the kingdom. And lastly (which alone would have merited the title that it bears, of the *great charter*), it protected every individual of the nation in the free enjoyment of his life, his liberty, and his property, unless declared to be forfeited by the judgment of his peers, or the law of the land. This excellent charter, so equitable, and beneficial to the subject, is the most ancient written law in the kingdom. By the 25th Edward I. it is ordained, that it shall be taken as the common law; and by the 43d Edward III. all statutes made against it are declared to be void.

CHARTARIUS, or CHARTOPHYLAX, an officer in the church of Constantinople, who has the custody of the archives, and is the representative of the patriarch.

CHARTER, *charta*, an instrument, or written evidence of a thing under the seal of a prince, lord, church, chapter, or community. The word charter comes from the Latin *charta*, anciently used for a public or authentic act; from χάρτης, thick paper, or pasteboard, whereon public acts were used to be written.

CHARTER, signifies also a privilege, immunity, or exemption.

CHARTER OF THE FOREST, is that wherein the laws of the forest are comprised and established. In the time of king John, and that of his son Henry III., the rigours of the feodal tenures and the forest laws were so warmly maintained, that they occasioned many insurrections of the barons or principal feudatories; which at last produced this effect, that first king John, and afterwards his son, consented to the two famous charters of English liberties, Magna Carta, and Carta de Foresta. The latter, in particular, was well calculated to redress many grievances and encroachments of the crown, in the exertion of forest law. This charter, as well as the other, was established, confirmed, and settled in the reign of Edward I.

CHARTER governments in the British colonies, are in the nature of civil corporations, with the power of making by-laws for their own interior regulation, not contrary to the laws of England; and with such rights and authorities as are specially given them in their several charters of incorporation. The form of government is borrowed from that of England. They have a governor named by the king, (or in some proprietary colonies by the proprietor) who is his representative or deputy. They have courts of justice of their own, from whose decision an appeal (as some say, in the nature of a reference by way of arbitration) lies to the king in council here in England. Their general assemblies, which are their house of commons, together with their council of state, being their upper house, with the concurrence of the king, or his representative, the governor, make laws suited to their own emergencies. But it is particularly declared, by stat. 7 and 8 William III. c. 22. that all laws, by-laws, usages, and customs, which shall be in practice in any of the plantations, repugnant to any law made, or to be made, in this kingdom, relative to the said plantations, shall be utterly void and of none effect.

CHARTER-HOUSE. See CHARTREUSE.

CHARTERPARTY, in commerce, denotes the instrument of freightage, or articles of agreement for the hire of a vessel. The charterparty is to be in writing; and is to be signed both by the proprietor, or the master of the ship, and the merchant who freights it.

The charterparty differs from a bill of lading, in that the first is for the entire freight, or lading, and that both for going and returning; whereas the latter is only for a part of the freight, or at most only for the voyage one way.

CHA'RTERED. *a.* (from *charter.*) Invested with privileges by charter; privileged (*Sh.*).

CHARTOPHYLAX. See CHARTARIUS.

CHARTRES, an ancient city of France, the episcopal see of the department of Eure and Loire. The cathedral is one of the finest in France. This city contains about 10,000 inhabitants, and is seated on the Eure, over which is a bridge, the work of the celebrated Vauban. Lat. 48. 27 N. Lon. 1. 34 E.

CHARTREUSE, or CHARTREUSE-GRAND, a celebrated monastery, the capital of all the convents of the Carthusian monks, situated on a steep rock in the middle of a large forest of fir-trees, about seven miles N. E. of Grenoble, in the former province of Dauphiny in France. Lon. 5. 5 E. Lat. 41. 20 N. (See CARTHUSIANS.) From this mother-convent, all the others of the same order take their names; among which was the Chartreuse of London, commonly called the Charter-house, now converted into an hospital, and endowed with a revenue of 600l. per ann. Here are

maintained 80 decayed gentlemen, not under 50 years of age; also 40 boys are educated and fitted either for the university or trades. Those sent to the university have an exhibition of 20l. a-year for eight years; and have an immediate title to nine church livings in the gift of the governors of the hospital, who are sixteen in number, all persons of the first distinction, and take their turns, in the nomination of pensioners and scholars.

CHARWELL, in geography, a river of England which runs into the Thames, near Oxford.

CHA'RY. *a.* (from *care.*) Careful; cautious; wary; frugal (*Carew*).

CHARYBDIS, a supposed whirlpool in the straits of Messina, and opposite to Scylla, a rock on the coast of Italy. Scylla and Charybdis, according to the fables of the poets, are two sea monsters, whose dreadful jaws are continually distended to swallow unhappy mariners. Although the ancient poets have given us lively descriptions of Scylla and Charybdis, yet many of the moderns doubt whether they ever had any real existence, and more still are of opinion that they have no existence now: we therefore present our readers with an extract from the account of the abbé Lazzaro Spallanzani, of Pavia, who, when in the straits of Messina, visited these two famous places.

"I first," says he, "proceeded in a small boat to Scylla. This is a lofty rock, distant 12 miles from Messina, which rises almost perpendicularly from the sea on the shore of Calabria, and beyond which is the small city of the same name. Though there was scarcely any wind, I began to hear, two miles before I came to the rock, a murmur and noise, like the confused barking of dogs, and, on a nearer approach, readily discovered the cause. This rock, in its lower parts, contains a number of caverns, one of the largest of which is called by the people there Dragara. The waves, when in the least agitated, rushing into these caverns, break, dash, throw up frothy bubbles, and thus occasion these various and multiplied sounds. I then perceived with how much truth and resemblance of nature Homer and Virgil, in their personifications of Scylla, had pourtrayed this scene, by describing the monster they drew as lurking in the darkness of a vast cavern, surrounded by ravenous barking mastiffs, together with wolves, to increase the horror:

> 'Ενθα Σκυλλη ναιει δεινον λελακυια,
> Της ητοι φωνη μεν όση σκυλακος νεογιλης,
> Γίνεται.'
>
> *Hom. Odyss.* XII.

> 'Here Scyllà bellows from her dire abodes,
> Tremendous pest! abhorr'd by man and gods!
> Hideous her voice, and with less terrors roar,
> The whelps of lions in the midnight hour.'
>
> *Pope.*

"Such is the situation and appearance of Scylla: let us now consider the danger it occasions to mariners. Though the tide is almost imperceptible in the open parts of the Mediterranean, it is very strong in the strait of Messina, in consequence of the narrowness of the channel, and is regulated, as in other places, by the periodical elevations and depressions of the water. Where the flow or current is accompanied by a wind blowing the same way, vessels have nothing to fear, since they either do not enter the strait, both the wind and the stream opposing them, but cast anchor at the entrance; or, if both are favourable, enter on full sail, and pass through with such rapidity that they seem to fly over the water. But, when the current runs from south to north, and the north wind blows hard at the same time, the ship which expected easily to pass the strait with the wind in its stern, on its entering the channel is resisted by the opposite current, and, impelled by two forces in contrary directions, is at length dashed on the rock of Scylla, or driven on the neighbouring sands, unless the pilot shall apply for the succour necessary for his preservation. For, to give assistance in case of such accidents, 24 of the strongest, boldest, and most experienced sailors, well acquainted with the place, are stationed, night and day, along the shore of Messina; who, at the report of guns fired as signals of distress from any vessel, hasten to its assistance, and tow it with one of their light boats. The current, where it is strongest, does not extend over the whole strait, but winds through it in intricate meanders, with the course of which these men are perfectly acquainted, and are thus able to guide the ship in such a manner as to avoid it. Should the pilot, however, confiding in his own skill, contemn or neglect this assistance, however great his ability or experience, he would run the most imminent risk of being shipwrecked. In this agitation and conflict of the waters, forced one way by the current, and driven in a contrary direction by the wind, it is useless to throw the line to discover the depth of the bottom, the violence of the current frequently carrying the lead almost on the surface of the water. The very strongest cables break like small cords. Should two or three anchors be thrown out, the bottom is so rocky that they either take no hold, or, if they should, are soon loosened by the violence of the waves. Every expedient afforded by the art of navigation, though it might succeed in saving a ship in other parts of the Mediterranean, or even the tremendous ocean, is useless here. The only means of avoiding being dashed against the rocks or driven upon the sands in the midst of this furious contest of the winds and waves, is to have recourse to the skill and courage of these Messinese seamen."

"But enough of Scylla: we will now proceed to Charybdis. This is situated within the strait, in that part of the sea which lies between a projection of land named Punta Secca, and another projection on which stands the tower Lanterna, or the light-house, a light being placed at its top to guide vessels which may enter the harbour by night.

"On consulting the authors who have written of Charybdis, we find that they all supposed it to be a whirlpool. The first who has asserted

this is Homer, who has represented Charybdis as a monster, which three times in a day drinks up the water, and three times vomits it forth.

——————*δια Χαρυβδις αναρροιβδει μελαν υδωρ,*
Τρις μεν γαρ τ' ανιησιν επ ηματι, τρις δ' αναρροιβδει
Δεινον.

Hom. Odyss. XII.

Beneath Charybdis holds her boisterous reign
'Midst roaring whirlpools, and absorbs the main;
Thrice in her gulfs the boiling seas subside,
Thrice in dire thunders she refunds the tide.

Pope.

"Charybdis is distant from the shore of Messina about 750 feet, and is called by the people of the country Calofaro, not from the agitation of the waves, as some have supposed, but from καλος and φαρος; that is, the beautiful tower, from the light-house erected near it, for the guidance of vessels. The phenomenon of the Calofaro is observable when the current is descending; for, when the current sets in from the north, the pilots call it the descending rema, or current; and when it runs from the south, the ascending rema. The current ascends or descends at the rising or setting of the moon, and continues for 6 hours. In the interval between each ascent or descent, there is a calm which lasts at least a quarter of an hour, but not longer than an hour. Afterwards, at the rising or setting of the moon, the current enters from the north, making various angles of incidence with the shore, and at length reaches the Calofaro. This delay sometimes continues two hours. Sometimes it immediately falls into the Calofaro, and then experience has taught that it is a certain token of bad weather. When I observed Charybdis from the shore, it appeared like a group of tumultuous waters; which group, as I approached, become more extensive and more agitated. I was carried to the edge, where I stopped some time to make the requisite observations, and was then convinced, beyond the shadow of a doubt, that what I saw was by no means a vortex, or whirlpool. Hydrologists teach us, that by a whirlpool in a running water we are to understand that circular course which it takes in certain circumstances; and that this course, or revolution, generates in the middle, a hollow inverted cone, of a greater or less depth, the internal sides of which have a spiral motion. But I perceived nothing of this kind in the Calofaro. Its revolving motion was circumscribed to a circle of, at most, an 100 feet in diameter; within which limits there was no incurvation of any kind, nor vertiginous motion, but an incessant undulation of agitated waters which rose, fell, beat and dashed on each other. Yet these irregular motions were so far placid, that nothing was to be feared in passing over the spot, which I did.

"I could not, therefore, but conclude, that, at that time, there was no whirlpool. I say, at that time, since the case might be very different when the sea was tempestuous. I therefore made inquiry relative to this of the pilots, those, especially, who, from their tried experience, were appointed by the public to give assistance in storms to foreign vessels, and who had frequently seen Charybdis in its greatest fury. The following is the substance of the answers they gave me: When the current and the wind are contrary to each other, and both in their greatest violence, especially when the scilocco, or south wind, blows, the swelling, and dashing of the waves within the Calofaro is much stronger, more impetuous, and more extensive. It contains three or four small whirlpools, or even more, according to the greatness of its extent and violence. If, at this time, small vessels are driven into the Calofaro by the current or the wind, they are seen to whirl round, rock and plunge; but are never drawn down into the vortex. They only sink when filled with water by the waves beating over them. When vessels of a larger size are forced into it, whatever wind they have they cannot extricate themselves; their sails are useless; and after having been for some time tossed about by the waves, if they are not assisted by the pilots of the country, who know how to bring them out of the force of the current, they are furiously driven upon the neighbouring shore of the Lanterna, where they are wrecked, and the greater part of their crews perish in the waves." Spallanzani's Travels in the Two Sicilies, vol. iv. 168. Nich. Jour. II. 12.

CHARYBDIS, is used by Dr. Plott to express certain openings which he supposes in the bottom of the sea, by which its waters are received and conveyed by a subterranean circulation to the origin of fountains and springs.

To CHASE. *v. a.* (*chasser*, French.) 1. To hunt (*Isaiah*). 2. To pursue as an enemy (*Judges*). 3. To drive away (*Proverbs*). 4. To follow as a thing desirable.

To CHASE METALS. See *To* ENCHASE.

CHASE. *s.* (from the verb.) 1. Hunting. 2. Pursuit of any thing as game (*Burnet*). 3. Fitness to be hunted (*Dryden*). 4. Pursuit of an enemy (*Knolles*). 5. Pursuit of something as desirable (*Dryden*). 6. The game hunted (*Granville*). 7. Open ground stored with such beasts as are hunted (*Shakspeare*). 8. The *chase of a gun*, is the whole bore or length of a piece (*Chambers*).

CHASE, a range or station for wild beasts of the forest. It is the same liberty as a park, excepting that it is not enclosed, and that one man may have a chase in another man's grounds as well as his own by prescription. Every forest is a chase, et quiddam amplius; on which last account every chase is not a forest. A chase, moreover, has no courts as a forest has, and offenders therein may not be punished by the laws of the forest but by common or statute law.

The beasts of chase are the buck, doe, fox, martern, and roe. The buck is so called in his sixth year; being before that period progressively a fawn, a pricket, a sorel, a sore, a buck of the first head, and at length a perfect or great buck. The doe is so denominated in her third year, in the first being called a fawn, in the

second a pricket's sister. The fox in the first year is called a cub, in the second a fox, in the third an old fox. The martern is so termed in his second year, in his first he is a martern cub. The roe is called kid in his first year, in his second a girl, in his third a hemuse, in his fourth a roe-buck of the first head, in his fifth a fair roe-buck.

The season for most of these chases begins about midsummer, and ends at Holyroodtide, a part of the year in which the sun's heat is excessive; so that, besides the danger of breaking his wind, and perhaps occasioning a rupture of the intestines, from the straining of his limbs by such desperate riding, you may create in a young horse an aversion to his labour, and in a short time the horse would prove altogether useless.

Horses employed in this violent exercise should therefore be such as have been long trained to hunting.

Young horses, the duke of Newcastle observes, are as subject to diseases as young children, therefore he advises, that, when any one would buy a horse for use in his ordinary occasions, as for journeys or hunting, he should never buy a horse till the mark be out of his mouth. If he be sound, in that case, he will last eight or nine years, with good keeping, and will never fail. "I am always ready," says he, "to buy for such purposes an old nag of some huntsman or traveller; for he gallops on all grounds, leaps over hedges and ditches, and such a one will not fail either on a journey or any-where else."

The next kind of chase we shall notice is that of the fox; which, though a recreation much in use, and highly applauded, yet is inconvenient for the training of a young horse, it being swift without respite, and of too long continuance. But the greatest inconvenience that happens in this chase is, that, when a fox is unkennelled, he seldom or never betakes himself to a champaign country, but remains in the strongest coverts and thickest woods; so that a young horse cannot accompany the hounds, without great risk of being stubbed, or some such dangerous accident.

The fittest horses for a fox-chase are those of great strength and ability, the season beginning at Christmas, which is the worst time of riding, and ending at Lady-day, when the ground is best for it.

Another chase worth noticing is that of the otter; which is not convenient for a horse, because he that will truly pursue this amphibious animal must often swim his horse, to the equal hazard both of the rider and the horse.

Hare-hunting, therefore, is the best chase both for pleasure and delight, were it not exceptionable on account of the inoffensiveness and natural timidity of the poor animal. It is indeed swift, and of some endurance, like that of the fox, but far more pleasant to the horse, because hares commonly run the champaign country; and the scent not being so hot as that of the fox, the dogs are oftener at fault, and by that means the horse has many rests, by which he recovers wind, and regains strength. For hare-hunting the season begins at Michaelmas, and lasts till the end of February.

The best dogs to bring a horse to perfection of wind and speed are the fleet northern hounds; for they, by their hard running, will draw him up to that extraordinary speed, that he will not have time to loiter; and by continual practice, will be inured and habituated to the violence of their speed, so that in a short time he will be able to go over all sorts of ground, and be at such command upon the hand, that he will strike at what rate you please, and three quarters speed will be the least troublesome to him. This may probably be one of the reasons why the northern breeders generally excel those of the south; since the speed of their hounds evidently contributes to the excellence of their horses. See HARE-HUNTING and HOUNDS.

CHASE-GUN. *s.* (from *chase* and *gun.*) Guns in the forepart of a ship, fired upon those that are pursued (*Dryden*).

CHA'SER. *s.* (from *chase.*) 1. Hunter; pursuer; driver (*Denham*). 2. An enchaser.

CHASM. *s.* (χάσμα.) 1. A cleft; a gap; an opening (*Locke*). 2. A place unfilled; a vacuity (*Dryden*).

CHASTE. *a.* (*chaste*, Fr. *castus*, Lat.) 1. Pure from all commerce of sexes (*Prior*). 2. Pure; uncorrupt. 3. Free from obscenity (*Watts*). 4. True to the marriage bed (*Titus*).

CHASTE-TREE. *s.* (*vitex.*) A tree. See AGNUS CASTUS and VITEX.

To CHA'STEN. *v. a.* (*chastier*, Fr.) To correct; to punish (*Rowe*).

To CHASTI'SE. *v. a.* (*castigo*, Latin.) 1. To punish; to correct by punishment (*Boyle*). 2. To reduce to order, or obedience (*Shaksp.*).

CHASTI'SEMENT. *s.* (*chastiment*, Fr.) Correction; punishment (*Bentley*).

CHASTI'SER. *s.* (from *chastise.*) A punisher; a corrector.

CHA'STITY. *s.* (*castitas*, Latin.) 1. Purity of the body (*Taylor*). 2. Freedom from obscenity (*Shakspeare*). 3. Freedom from bad mixture of any kind.

CHA'STLY. *ad.* (from *chaste.*) Without incontinence; purely; without contamination.

CHA'STNESS. *s.* (from *chaste.*) Chastity; purity.

To CHAT. *v. n.* (from *caquetter*, Fr.) To prate; to talk idly; to prattle (*Spenser*).

CHAT. *s.* (from the verb.) Idle talk; prate; slight or negligent tattle (*Pope*).

CHAT. *s.* The keys of trees are called chats.

CHATE, in botany. See CUCUMIS.

CHATEAU CAMBRESIS, a town of France, in the department of the North, with a noble police which belonged to the archiepiscopal see of Cambray. Lat. 48. 7 N. Lon. 3. 40 E.

CHATEAUDUN, an ancient town of France, in the department of Eure and Loire. Here is a castle and holy chapel, built by the famous count of Dunois. Lat. 48. 4 N. Lon. 1. 22 E.

CHATEAU LANDON, (the ancient *Vellaunodunum*), a town of France, in the department of Seine and Marne, with a late Augustin Abbey. Lat. 48. 11 N. Lon. 2. 38 E.

CHATEAUROUX, a town of France, recently erected into the episcopal see of the department of Indre, with a castle. It has a manufacture of cloth. Lat. 46. 46 N. Lon. 1. 51 E.

CHATELET (the Marchioness), a learned French lady, was born in 1706, and died in 1749. She wrote a work of considerable merit, entitled Institutes of Natural Philosophy.

CHA'TELLANY. *s.* (*chatelenie*, Fr.) The district under the dominion of a castle.

CHATHAM, a town of England, in the county of Kent, on the Medway, united to the city of Rochester, of which it is probably a suburb; celebrated for its dock, improved and enlarged by queen Elizabeth, who built Upnor Castle for its defence. Charles I. extended it very considerably. An immense quantity of naval stores of all kinds are kept ready in magazines and warehouses, arranged in such regular order, that whatever is wanted may be procured without the least confusion. In the smith's yard, anchors are made, some of which weigh five tons. In the rope-house, which is 700 feet in length, cables have been made 120 fathoms long, and 22 inches round. Here are docks for building and repairing ships of the largest size. On the ordnance wharf, the guns belonging to each ship are arranged in tiers, with the name of the ship to which they belong marked upon them, as also their weight of metal. That excellent fund for the relief of wounded seamen, called the Chest at Chatham, was instituted in the year 1588, after the defeat of the Spanish armada, when the queen Elizabeth, by advice of sir Francis Drake, sir John Hawkins, and others, assigned a portion of every seaman's pay to the relief of seamen who have been wounded or disabled in the navy: it is now removed to Greenwich. In the year 1667, the Dutch fleet took and dismantled Sheerness, and sailing up the Medway, burnt three guard-ships, and attacked Upnor Castle, but were repulsed, and in their return burned and damaged three men of war. Here also, or rather in the contiguous village of Brompton, are very fine and extensive barracks for the accommodation of the military of the garrison. Chatham contains more than 3000 inhabitants, and is 31 miles S. E. of London. It has a market on Saturdays. Lat. 51. 22 N. Lon. 0. 36 E. The towns of Rochester, Stroud, and Chatham, lie so close together as to form one continued street about 3 miles long.

CHATELLERAULT, a town of France, in the department of Vienne, noted for its cutlery, watch-making, and the cutting of false diamonds. Lat. 46. 50 N. Lon. 0. 44 E.

CHATILLON-SUR-SEINE, a town of France, in the department of Côt d'Or, divided into two by the river Seine. It has iron works in its neighbourhood. Lat. 47. 42 N. Lon. 4. 35 E.

CHATTELS, originally, meant moveable goods; but now applies to all sorts moveable or immoveable, except such as are in the nature of freehold.

To CHA'TTER. *v. a.* (*caqueter*, French.) 1. To make a noise as a pie, or other unharmonious bird (*Sidney. Dryden*). 2. To make a noise by collision of the teeth (*Prior*). 2. To talk idly or carelesly (*Watts*).

CHA'TTER. *s.* (from the verb.) 1. Noise like that of a pie or monkey (*Swift*). 2. Idle prate.

CHA'TTERER. *s.* (from *chatter.*) An idle talker; a prattler.

CHATTERER, in ornithology. See AMPELIS.

CHATTERTON (Thomas), a late unfortunate poet, whose fate and performances have excited in no small degree the public attention, as well as given rise to much literary controversy. He was born at Bristol, Nov. 20, 1752; and educated at a charity-school on St. Augustin's Back, where nothing more was taught than reading, writing, and accounts. At 14 years of age he was articled clerk to an attorney at Bristol, with whom he continued about three years; yet, though his education was thus confined, he discovered an early turn towards poetry and English antiquities, and particularly towards heraldry. On leaving the attorney he went to London, where he earned a scanty maintenance by writing for periodical publications, and in a fit of despair put an end to his life by poison, in August, 1770. In 1778 were published, in one volume, 8vo. Miscellanies, in Prose and Verse, by Thomas Chatterton; and a new edition of his works is now about to be printed by subscription, for the benefit of his sister. But what has given celebrity to his name is the real or pretended discovery of poems, written in the 15th century, by Thomas Rowley, a priest of Bristol, and others, in Redcliff church, of which Chatterton's ancestors had been sextons near a century and a half. These poems appeared in 1777, in one volume, and soon attracted considerable notice; at first many learned critics and good poets concluded them genuine, but at length the stream turned, and those who had admired them as antiques, condemned them as the forgeries of a boy of 16. Some able writers, however, still held them to be the productions of Rowley, and a long controversy ensued, in which the cause of the "Bristowyan priest" lost ground every day, so that now hardly any person will venture a word on his behalf. Yet it must be admitted as very extraordinary, that a boy, without a classical education, and constantly employed in an attorney's office, should be able to forge such a quantity of various poetry, and give them too an air of antiquity sufficient to deceive good judges. Many interesting particulars respecting Chatterton are related in Dr. G. Gregory's account of his life; where may also be seen a concise view of the

controversy concerning Rowley's poems. Dr. Knox in his "Essays" has paid a fine tribute to the memory of Chatterton, an extract from which will, we trust, give pleasure to our readers. "Malice, if there was any, may surely now be at rest, for 'cold he lies in the grave below.' But where were ye, O ye friends to genius, when, stung with disappointment, distressed for food and raiment, with every frightful form of human misery painted on his fine imagination, poor Chatterton sunk in despair? Alas! ye knew him not then, and now it is too late,—

'For now he is dead,
Gone to his death-bed,
All under the willow-tree.'

"So sang the sweet youth, in as tender an elegy as ever flowed from a feeling heart . . . . In return for the pleasure I have received from thy poems, I pay thee, poor boy, the trifling tribute of my praise. Thyself thou hast emblazoned; thine own monument thou hast erected. But they whom thou hast delighted, feel a pleasure in vindicating thine honours from the rude attacks of detraction. Thy sentiments, thy verse, thy rhythm, all are modern, all are thine. By the help of glossaries and dictionaries, and the perusal of many old English writers, thou hast been able to translate the language of the present time into that of former centuries. Thou hast built an artificial ruin. The stones are mossy and old, the whole fabric appears really antique to the distant and the careless spectator; even the connoisseur, who pores with spectacles on the single stones, and inspects the mossy concretions with an antiquarian eye, boldly authenticates its antiquity; but they who examine without prejudice, and by the criterion of common sense, clearly discover the cement and the workmanship of a modern mason." (*Essay* 144.)

CHAUCER (Geoffrey), the father of English poetry. He was born in London in 1328, and educated at both universities, after which he went abroad. On his return he entered of the Inner Temple, but soon after attended the court, and was made page to the king, who gave him a pension of 20 marks out of the exchequer, which in 1369 was doubled. The year following he was appointed his majesty's shield-bearer. He was sent to Genoa some time after to hire ships for the king's service, and at his return obtained a grant of a pitcher of wine a day, to be delivered by the butler of England; and the place of comptroller of the customs of London, for wool, &c. In the succeeding reign he was obliged to go abroad to avoid the resentment of the clergy for having embraced the doctrines of Wickliffe. He returned privately, but was taken and committed to prison, from whence he was not released till he had made his submission. On this he retired to Woodstock, where he employed himself in correcting his works. Here he published his Treatise on the Astrolabe. Henry IV. in the 1st year of his reign, gave him an annuity of 40 marks for his life. He died in 1400, and was buried in Westminster abbey. Chaucer married Philippo Roxet, a lady of good family, and sister to the wife of John of Gaunt, duke of Lancaster, who was his great patron while he was himself in power. The year before his death he had the pleasure to see the son of his brother-in-law seated on the throne. Chaucer left two sons, one of whom was speaker of the house of commons, and ambassador to France. Of his poems, the Canterbury Tales are by far the most admired.

Chaucer was not only the first, but one of the best poets which these kingdoms ever produced. He was equally great in every species of poetry which he attempted; and his poems in general possess every kind of excellence, even to a modern reader, except melody and accuracy of measure; defects which are to be attributed to the imperfect state of our language, and the infancy of the art in this kingdom at the time when he wrote. "As he is the father of English poetry," says Mr. Dryden, "so I hold him in the same degree of veneration as the Grecians held Homer, or the Romans Virgil. He is a perpetual fountain of good sense, learned in all sciences, and therefore speaks properly on all subjects. As he knew what to say, so he knows also when to leave off; a continence which is practised by few writers, and scarcely by any of the ancients, except Virgil and Horace." This character Chaucer certainly deserved. He had read a great deal; and was a man of the world, and of sound judgment. He was the first English poet who wrote poetically, as Dr. Johnson observes in the preface to his Dictionary, and (he might have added) who wrote like a gentleman. He had also the merit of improving our language considerably, by the introduction and naturalization of words from the Provençal, at that time the most polished dialect in Europe. For farther particulars the reader may consult Godwin's Life of Chaucer.

CHAVES, a town of Portugal, in Tralos-Montes, seated at the foot of a mountain, on the river Tamega. Lat. 41. 45 N. Lon. 7. 0 W.

CHAULNES (The Duke de), a peer of France, but more honourable and remarkable as an astronomer and mathematician. He was born at Paris Dec. 30, 1714. He soon discovered a singular taste and genius for the sciences; and in the tumults of armies and camps, he cultivated mathematics, astronomy, mechanics, &c. He was named honorary-academician the 27th of February 1743, and few members were more punctual in attending the meetings of that body; where he often brought different constructions and corrections of instruments of astronomy, of dioptrics, and achromatic telescopes. These researches were followed with a new parallactic machine, more solid and convenient than those that were in use; as also with many reflections on the manner of applying the micrometer to those telescopes, and of measuring exactly the value of the parts of that instrument. The duke of Chaulnes proposed many other works of the

same kind, when death surprised him the 23d Sept. 1769.

He had several papers published in the volumes of Memoirs of the Academy of Sciences.

CHAUMONT, a town of France, in the department of Upper Marne. The principal gate of its college church is much admired. Lat. 48. 8 N. Lon. 5. 9 E.

CHAUNTRY. See CHANTRY.

CHAUSSE (Michael Angelo de la), a French antiquary, who published at Rome, in 1690, his Musæum Romanum, which was reprinted in 1746, in 2 vols. folio. He also published in 1707, a Receuil des Pierres Gravées Antiques, in 4to.; and in 1738, Picturæ Antiquæ Cryptarum Romanarum et Sepulchri nasonum, fol.

To CHAW. *v. a.* (*kawen*, Germ.) To champ between the teeth; to chew (*Donne*).

CHAW. *s.* (from the verb.) The chap.

CHA'WDRON. *s.* Entrails (*Shakspeare*).

CHAW-STICK, in botany. See GOUANIA.

CHAYOTA, in botany. See SECCHIUM.

CHAZELLES (John Matthew), a French mathematician, born at Lyons in 1657, and after finishing his studies in the college of the jesuits became an assistant to Cassini in drawing the meridian line. In 1685 he was made hydrographical professor of the galleys at Marseilles, in which situation he made many improvements, and drew a number of maps of the coast. He afterwards went into Greece and Egypt, and while in the latter country he measured the pyramids, and discovered that the four sides of the largest answer to the cardinal points. He was elected a member of the Academy of Sciences in 1695, and died in 1710.

CHAZINZARIANS, a sect which rose in Armenia in the seventh century. The word is formed of the Armenian *chazus*, cross. They are also called *staurolatræ*, which in Greek signifies the same as *Chazinzarians* in Armenian, viz. adorers of the cross; they being charged with paying adoration to the cross alone. In other respects they were Nestorians; and admitted two persons in Jesus Christ.

CHE, a town of China, of the third rank, in the province of Ho-nan: twelve leagues W.N.W. Se.

CHEADLE, a town of England, in the county of Stafford; in a country abounding with coal: there are very extensive copper and brass works in the neighbourhood. It has a weekly market on Fridays: fifteen miles N.E. Stafford, and 146 N.N.W. London.

CHEAP. *a.* (ceapan, Saxon.) 1. To be had at a low rate (*Locke*). 2. Easy to be had; not respected (*Bacon*).

CHEAP. *s.* Market; purchase; bargain (*Sidney*).

To CHE'APEN. *v. a.* (ceapen, Sax. to buy.) 1. To attempt to purchase; to bid for; to ask the price of (*Prior*). 2. To lessen value (*Dryden*).

CHE'APLY. *ad.* (from *cheap.*) At a small price; at a low rate (*Dryden*).

CHE'APNESS. *s.* (from *cheap.*) Lowness of price (*Temple*).

To CHEAT. *v. a.* To defraud; to impose upon; to trick (*Tillotson*).

CHEAT. *s.* 1. A fraud; a trick; an imposture (*Dryden*). 2. A person guilty of fraud (*South*).

CHEA'TER. *s.* (from *cheat.*) One that practises fraud (*Taylor*).

CHEATS, are deceitful practices in defrauding, or endeavouring to defraud, another of his known right, by means of some artful device. If any person deceitfully get into his hands or possession any money or other things of any other person's, by colour of any false token, &c. being convicted, he shall have such punishment by imprisonment, setting upon the pillory, or by any corporal pain except pains of death, as shall be adjudged by the persons before whom he shall be convicted.

To CHECK. *v. a.* 1. To repress; to curb (*Bacon. Milton*). 2. To reprove; to chide (*Shakspeare*). 3. To compare a bank note, or other bill, with the correspondent paper. 4. To control by a counter reckoning.

To CHECK. *v. n.* 1. To stop; to make a stop (*Locke*). 2. To clash; to interfere (*Bacon*). 3. To strike with repression (*Dryden*).

CHECK. *s.* (from the verb.) 1. Repressure; stop; rebuff (*Rogers*). 2. Restraint; curb; government (*Clarendon*). 3. A reproof; a slight (*Shakspeare*). 4. A dislike; a sudden disgust (*Dryden*). 5. The cause of restraint; a stop (*Clarendon*).

CHECK, in falconry, is where a hawk forsakes her proper games, to follow rooks, pies, or other birds that cross her in her flight.

CHECK (Clerk of the), in the king's household, has the check and controul of the yeomen of the guard, and all the ushers belonging to the royal family, noting their absence or defects in attendance, or diminishing their wages for the same, &c. He also, by himself or deputy, superintends those that are to watch in the court, and has the setting of the watch, &c.

CHECK (Clerk of the), in the royal dockyards, an officer who keeps a muster or register of all the men employed aboard his majesty's ships and vessels, and also of all the artificers and others in the service of the navy at the part where he resides.

CHECK, or CHECK-ROLL, a roll or book, wherein is contained the names of such persons as are attendants and in pay to the king, or other great personages, as their household servants.

CHECKS, or DRAFTS ON BANKERS, are instruments by means of which a creditor may assign to a third person, not originally party to the contract, the legal as well as equitable interest in a debt raised by it, so as to vest in such an assignee a right of action against the original debtor. These instruments are uniformly made payable to bearer, which constitutes a characteristic difference between them and bills of exchange; and the legislature has considered them in a more favourable point of

view, by exempting them from the stamp duties. They are equally negociable with bills. When given in payment they are considered as cash; and, it is said, may be declared upon as a bill of exchange; and the moment this resemblance begins, they are governed by the same principles of law as bills of exchange. Checks payable on demand, or when no time of payment is expressed, are payable on presentment, without any indulgence or days of grace; but the presentment should be made within a reasonable time after the receipt, otherwise the party upon whom the check is drawn will not be responsible, and the person from whom the holder received it will be discharged. Therefore, where circumstances will allow of it, it is advisable for the holder of a check to present it on the same day it is received. Checks, when drawn within 10 miles of the banker's office, are negociable without being drawn upon stamped paper.

To CHE'CKER. *To* CHE'QUER. *v. a.* (from *echecs*, chess, Fr.) To variegate or diversify, in the manner of a chess-board (*Pope*).

CHE'CKER. CHE'CKER-WORK. *s.* Work varied alternately (*Kings*).

CHE'CKMATE. *s.* (*echec est mat*, Fr.) The movement on the chess-board, that kills or stops the opposite men (*Spenser*).

CHECKY, in heraldry, is when the shield, or a part thereof, as a bordure, &c. is chequered, or divided into chequers or squares, in the manner of a chess-board.

CHEDDER, a large village of Somersetshire, famous for its cheeses, which are the next best to Stilton cheese in England, and as large as those of Cheshire. It is three miles E. of Axbridge. Lon. 2. 57 W. Lat. 51 13 N.

CHEDWORTH, a village of Gloucestershire, four miles S. W. of North Leach, through which the river Coln runs to Fairford. It is situated on the declivity of two hills. In this parish, in 1760, a Roman bath was discovered. The Roman fosse lies about two miles N. W. of this spot. There is a tumulus on a hill near this bath, with a remarkably large stone set upright on the top of it, on the removal of which great quantities of human bones were discovered.

CHEEK. *s.* (ceac, Saxon.) In anatomy, that part of the face which is situated below the eye on each side.

CHEEKS, a general name among mechanics, for almost all those pieces of their machines and instruments that are double, and perfectly alike. Thus the cheeks of a printing-press are its two principal pieces: they are placed perpendicular, and parallel to each other; serving to sustain the three sommers, viz. the head, shelves, and winter, which bear the spindle, and other parts of the machine. See PRINTING-PRESS.

The cheeks of a turner's lathe are two long pieces of wood between which are placed the puppets, which are either pointed or otherwise, serving to support the work and the mandrils of the workman. These two pieces are placed parallel to the horizon, separated from one another by the thickness of the tail of the puppets, and joined with tenons to two or three pieces of wood placed perpendicularly, called the legs of the lathe.

Cheeks of the glazier's vice, are two pieces of iron joined parallel at top and bottom; in which are the axles, or spindles, little wheel, cushions, &c. whereof the machine is composed.

The cheeks of a mortar, or the brackets, in artillery, are made of strong planks of wood, bound with thick plates of iron, and are fixed to the bed by four bolts; they rise on each side of the mortar, and serve to keep her at what elevation is given her, by the help of strong bolts of iron which go through both cheeks, both under and behind the mortar, betwixt which are driven coins of wood; these bolts are called the bracket-bolts, and the bolts which are put on in each end of the bed are the traverse-bolts, because with hand-spikes the mortar is by these traversed to the right or left.

CHEEKS, in ship-building, two pieces of timber, fitted on each side of the mast, at the top, serving to strengthen the mast there, and having holes in them, called hounds, through which the ties run to hoist the yards. Also the uppermost rail, or piece of timber in the beak of a ship, and those on each side of the trail-board, are called the upper and lower cheek.

The knees also which fasten the beak-head to the bows of a ship are called cheeks.

CHE'EKBONE. *s.* The jaw (*Wiseman*).

CHE'EKTOOTH. *s.* The hinder-tooth or tusk (*Joel*).

CHEER. *s.* (*chere*, French.) 1. Entertainment; provisions (*Locke*). 2. Invitation to gaiety (*Shakspeare*). 3. Gaiety; jollity (*Shakspeare*). 4. Air of the countenance (*Daniel*). 5. Temper of mind (*Acts*).

To CHEER. *v. a.* (from the noun.) 1. To incite; to encourage; to inspirit (*Dry.*). 2. To comfort; to console (*Shakspeare*). 3. To gladden (*Pope*).

To CHEER. *v. n.* To grow gay or gladsome.

CHE'ERER. *s.* (from *to cheer.*) Gladner; giver of gayety (*Wotton. Walton*).

CHE'ERFUL. *a.* (from *cheer* and *full.*) 1. Gay; full of life; full of mirth (*Spenser*). 2. Having an appearance of gayety (*Prov.*).

CHE'ERFULLY. *ad.* Without dejection; with gayety (*South*).

CHE'ERFULNESS. *s.* (from *cheerful.*) 1. Freedom from dejection; alacrity (*Till.*). 2. Freedom from gloominess (*Sidney*).

CHE'ERLESS. *a.* (from *cheer.*) Without gayety, comfort, or gladness (*Dryden.*)

CHE'ERLY. *a.* (from *cheer.*) 1. Gay; cheerful (*Ray.*) 2. Not gloomy; not dejected.

CHE'ERLY. *ad.* (from *cheer.*) Cheerfully (*Milton*).

CHE'ERY. *a.* (from *cheer.*) Gay; sprightly; gladsome: a ludicrous word (*Gay*).

CHEESE. *s.* (cyre, Saxon.) A kind of food made by pressing the curd of coagulated milk, and suffering the mass to dry.

As this article constitutes a material portion of domestic consumption, we propose to describe the methods of preparing the principal kinds, both at home and abroad; availing ourselves of the accounts given by our judicious fellow-labourer in this department of human knowledge, Dr. Willich.

1. STILTON CHEESE is generally made in Leicestershire, though it is principally sold at the inns in the village of that name in Huntingdonshire: some of the same kind of cheese has also been made by the dairy-women of Yaxley near Stilton. From the peculiar richness and flavour of this cheese, it is sometimes called English Parmesan. The process of making it is as follows: the night's cream is put to the morning's milk, with the rennet; when the curd is come, it is not broken, as is usually done with other cheese, but taken out whole, and put into a sieve, in order to drain gradually. While draining, it is pressed till it becomes firm and dry; when it is placed in a wooden hoop, or box, made to fit it, as it is so extremely rich, that without this precaution, it would be apt to separate. It is afterwards kept on dry boards, and turned daily, with cloth binders round it, which are tightened as occasion requires. After being taken out of the hoop, the cheese is closely bound with cloths, which are changed every day, till it acquires sufficient firmness to support itself: when these cloths are removed, each cheese is rubbed over daily, for two or three months, with a brush; and, if the weather be damp, or moist, twice a-day: the tops and bottoms are treated in a similar manner every day, even before the cloths are taken off.

Stilton cheese is sometimes made in nets, resembling cabbage-nets; but these are neither so good, nor so richly flavoured, as those prepared in the manner before described.

Although the Leicestershire farmers are in much repute for their cleanliness, they take but little pains with the rennet; as they, in general, cut small pieces from the vell, or maw, that are put into the milk; and, being gently agitated with the hand, break, or turn it, so that the curd is easily obtained. We venture, however, to say, that their valuable cheese might be improved, and few broken ones occur, if they would prepare the rennet in the manner adopted in the west of England; namely, by keeping the vell, maw, or rennet-bag (as it is differently called), perfectly sweet and fresh; for, if it be in the least degree tainted, the cheese will never acquire a fine flavour. When the vell, or maw, is fit for the purpose, a strong solution of salt should be made, with two quarts of soft, sweet water, into which are to be introduced sweet briar, rose leaves, and flowers, cinnamon, mace, cloves, and, in short, almost every kind of spice and aromatics that can be procured. The whole must boil gently, till the liquor is reduced to three pints, and care should be taken that it be not smoked. The spices should next be strained clean, and the liquid, when milk warm, poured upon the vell, or maw. A lemon may then be sliced into it, and the whole stand at rest for a day or two; after which it should be again strained and bottled. Thus, if well corked, it will keep good for twelve months or longer, possess a fine aromatic odour, and impart an agreeable flavour to the cheese.

2. CHESHIRE CHEESE is prepared in the following way: The evening's milk is not touched till the next morning, when the cream is taken off, and put to warm in a brass pan, heated with boiling water: one-third part of that milk is heated in a similar manner. The cows being milked early in the morning, the new milk, and that of the preceding night, thus prepared, are poured into a large tub, together with the cream. A piece of rennet, kept in luke-warm water, since the preceding evening, is put into the tub, in order to coagulate the milk; with which, if the cheese is intended to be coloured, a small quantity of arnotto (or of an infusion of marigolds, or carrots), is rubbed fine and mixed; the whole is stirred together, and, being covered up warm, allowed to stand about half an hour, or till it is coagulated: when it is first turned over with a bowl, to separate the whey from the curds, and broken soon after into very small particles: the whey being separated, by standing some time, is taken from the curd, which sinks to the bottom, and is then collected into a part of the tub, provided with a slip, or loose board, to cross the diameter of the bottom, for the sole purpose of effecting this separation; on which a board is placed, weighing from 60 to 100 pounds, in order to press out the whey. As soon as it acquires a greater degree of solidity, it is cut into slices, and turned over several times, to extract all the whey, and again pressed with weights: these operations may consume about an hour and a half. It is then taken from the tub, and broken very small by the hand, salted, and put into a cheese vat, the depth of which is enlarged by a tin hoop fitted to the top. The side is then strongly pressed, both by hand, and with a board at the top, well weighted; and wooden skewers are placed round the cheese, at the centre, which are frequently drawn out. It is then shifted out of the vat, a cloth being previously put on the top of it, and reversed on the cloth into another vat, or again into the same, if well scalded, before the cheese be returned to it. The top, or upper part, is next broken by the hand down to the middle, salted, pressed, weighted, and skewered, as before, till all the whey is extracted. This being done, the cheese is again reversed into another vat, likewise warmed, with a cloth under it, and a tin hoop, or binder, put round the upper edge of the cheese, and within the sides of the vat; the former being previously inclosed in a cloth, and its edges put within the vessel. These various operations are performed from about seven o'clock in the morning till one at noon. The pressing of the cheese requires about eight hours more, as it must be twice turned in the vat, round which thin wire skewers are passed, and shifted occasionally. The next morning it ought to be turned, and pressed again, as likewise at night, and on the succeeding day; about the middle of which it is removed to the salting-room, where the outside is salted, and a cloth binder tied round it. After this process, the cheese is turned twice daily, for six or seven days; then left two or three weeks to dry, during which time, it is once turned, and cleaned every day; and at length deposited in the common cheese-room, on a boarded floor, covered with straw, where it is turned daily, till it acquires sufficient hardness. The room should be of a moderate warmth, but no wind, or draught of air, must be permitted to enter, as this generally cracks the cheese. The outsides, or rinds of them, are sometimes rubbed with butter or oil, in order to give them a coat.

3. GLOUCESTER CHEESE is made of milk im-

mediately from the cow; but which, in summer, is thought too hot, and is therefore lowered to the requisite degree of heat, before the rennet is added, by pouring in skim-milk, or, if that will not answer, by the addition of water. As soon as the curd "is come," it is broken with a double cheese knife, and also with the hand, in order to clear it from the whey, which is laded off. The curd being thus freed from the principal part of the whey, is put into vats, which are set in the press for ten or fifteen minutes, in order to extract all the remaining liquid. It is then turned out of the vats into the cheese tubs again; broken small, and scalded with a pailful of water, lowered with whey, about three parts water to one of whey; and the whole is briskly agitated, the curd and water being equally mixed together. After having stood a few minutes to let the curd subside, the liquor is poured off; and the former collected into a vat, the surface of which is, when about half full, sprinkled with a little salt that is worked in among the curd. The vat is then filled up, and the whole mass turned two or three times in it, the edges being pared, and the middle rounded up at each turning. At length the curd is put into a cloth, and placed in the press, whence it is carried to the shelves, and turned generally once a day, till it has acquired a sufficient degree of compactness to enable it to undergo the operation of washing.

4. Wiltshire cheese. The milk which produces this cheese is run, as it comes from the cow, or as it happens to be lowered, by the small quantity of skim-milk mixed with it. The curd is first broken with the hand and dish, care being taken in first crushing the curd to let the whey run off gradually, to prevent its carrying away with it the "fat" of the cowl. For thin cheese, the curd is not broken so fine as in Gloucestershire; for thick cheese, it is crushed still finer; and, for what is called loaves, it is in a manner reduced to atoms. The whey is poured off as it rises, and the curd pressed down. The mass of curd is then pared down three or four times over, in slices about an inch thick, in order to extract all the whey from it, pressed and scalded in a similar manner to the Gloucester cheese. After separating the whey, the curd is, in some dairies, rebroken, and salted in the cowl; while in others, it is taken warm out of the liquor and salted in the vat: thin cheeses being placed, with a small handful of salt, in one layer; thick ones, with two small handfuls, in two layers; loaves, with two handfuls, in three or four layers; the salt being spread and rubbed uniformly among the curd. Wiltshire cheese is commonly salted twice in the press, where it remains in proportion to its thickness; thin cheeses three or four meals; thick ones four or five; and loaves five or six.

5. Cottenham cheese. The superiority of this cheese, both in delicacy and flavour, is not ascribed to any particular management of the dairies, but solely to the fragrant nature of the herbage on the commons.

6. Suffolk, or Skim cheese. The curd used in making this cheese is "broken up" in the whey, which is poured off as soon as the former has subsided; the remainder with the curd being thrown into a coarse strainer, and exposed for cooling, is then pressed as tightly as possible; after which, it is put into a vat, and set in a press for a few minutes to discharge the remaining whey. When all the liquid part is drained off, the curd is taken out, again broken as finely as possible, salted and returned to the press.—In some large dairies mills are employed for breaking the curd.—This kind of cheese is much used at sea, as being less liable to be affected by the heat of warm climates than others.

7. Chedder cheese is held in high estimation; but its goodness is attributed chiefly to the land on which the cows feed, as the method of making it is similar to that pursued throughout Somersetshire, and the adjoining counties.

8. Lincolnshire cheese. By adding the cream of one meal's milk, to that which comes immediately from the cow, excellent cream cheese is made in that county. It is gently pressed two or three times, and turned for a few days, previous to its being sent to market. This cheese is usually eaten while new, with salad, radishes, &c.

Having thus given an account of the principal sorts of cheese produced in this country, we shall likewise enumerate some of the most celebrated kinds prepared on the continent.

1. The Parmesan cheese is made of the evening's milk, after having been skimmed in the morning and at noon, and mixed with that of the morning, which has likewise been previously skimmed at noon. The whole is poured into a copper cauldron, resembling an inverted bell, and suspended on the arm of a lever, so as to be moved off and on the fire at pleasure. In this, the milk is gradually heated to the temperature of about 120 degrees, when it is removed from the fire. As soon as it has subsided, the rennet, in a small bag, is steeped in it; and, being occasionally squeezed, a sufficient quantity of it soon passes into the milk, which is then well stirred and left to coagulate. In the course of an hour, the coagulation is completed, when the milk is again put over the fire, and raised to a temperature of about 145 degrees: and, while it is heating, the whole mass is briskly agitated, till the curd separates in small lumps. Part of the whey is then taken out, and a little saffron added to the remainder, in order to colour it. When the curd is thus broken sufficiently small, nearly the whole of the whey is taken out, and two pailfuls of cold water poured in, by which the temperature is lowered, so as to enable the dairy-man to collect the former, by passing a cloth beneath it, and gathering it up at the corners. The curd is then pressed into a frame of wood, resembling a peck-measure without a bottom, placed on a solid table, and covered by a round piece of wood, with a great stone at the top. In the course of the night it cools, assumes a firm consistence, and the whey drains off. The next day one side is salted, and on the succeeding day the cheese is turned, and the other side is rubbed in a similar manner. This operation is continued for about forty days, when the outer crust of the cheese is pared off, the fresh surface is varnished with linseed oil, the convex side coloured red, and the cheese is fit for use.

2. Green Swiss cheese appears to possess no other peculiarity than that derived from the fragrant powder of the common meliot, or the trifolium melilotus officin. L., which, however, imparts to it a strong flavour, rather offensive than agreeable to most persons: hence it is not calculated to become a favourite article in this country, though considerable quantities of Swiss cheese are annually imported for the tables of the luxurious.

3 Dutch cheese is likewise prepared in the manner generally adopted in Cheshire, with this difference, that the Dutch, instead of rennet,

make use of spirit of salt. Hence their cheese not only acquires a sharp saline taste, but is also said to be exempt from the depredations of mites: its rich buttery quality must be ascribed to the luxuriant vegetation in the low countries.

4. WESTPHALIA CHEESE. M. Hochheimer, a German author, asserts, "that it is preferred in England to the Dutch, Swiss, and even Parmesan cheese." Having had no experience of its taste, we can only give an account of the manner in which it is prepared.

After the cream is removed from the milk, when in a sub-acid state, the latter is placed near a fire, spontaneously to coagulate. The curd is then put into a coarse bag, and loaded with ponderous stones to express the whey: in this dry state, it is rubbed between the hands, and crumbled into an empty clean milk-vat, where it is suffered to remain from three to eight days, accordingly as the cheese is intended to be strong or mild. This part of the process is called "skinning," or more properly, mellowing; because it undergoes the putrid stage of fermentation, and acquires a coat or skin on the top, before it is taken out of the vessel, and kneaded into balls or cylinders, with the addition of a considerable portion of caraways, salt, and butter; or, occasionally, a small quantity of pounded pepper and cloves. But, if it be too far advanced in the mellowing process, a third part of fresh curds, likewise crumbled into small pieces, is superadded, to prevent or correct its putrid tendency. In short, the whole mass requires a powerful hand to form a complete union of parts; for it is very apt to corrupt, when imperfectly kneaded. As the pieces, when moulded, are of small size, not exceeding three or four ounces each in weight, they soon dry in the open air, and are then fit for use. It is, however, necessary to turn and clean them, as well as to shift their places every day upon a board, in order to promote their maturity. After being nearly dry, they are sometimes (for the palate of epicures) suspended in a wood-fire chimney, by means of a net, for several weeks or months; and both their taste and flavour are said to be remarkably improved, whether kept in a dry air, or subjected to the action of smoke.

5. POTATOE CHEESE. There are three varieties of this curious article prepared in Germany: we shall, however, describe only that sort which appears to us the most plausible.—The best mealy potatoes are selected and half-boiled in steam; as, by bursting, their flavour and efficacy are diminished. When cool, they are peeled and finely grated, or beat into a pulp with a wooden pestle. Three parts of this soft mass, and two parts of sweet curd, after expressing all its whey, are kneaded together, and allowed to stand two or three days in warm, and four or five days in cold, weather. The mixture is then formed into small pieces, like those of Westphalia cheese, and dried in a similar manner.

"But," says M. Hochheimer, "if you wish to procure a more delicious potatoe-cheese, take only one part of potatoes, and three of the curd made of sheep's milk; let the kneaded mass remain three or four days in a vat, to become mellow; then put a stratum of it, one inch high, into a small firkin, strew a few lilac flowers, or caraways and mace over it; spread a little fresh butter, about the size of a walnut, over these aromatics; then form another layer, repeat the same mode of seasoning the cheese, and proceed in a similar manner to the top of the vessel. When this cheese has been kept for some days in a dry airy place, without being exposed to the sun, it is said to excel in taste the best sort made in Holland; and to possess the additional advantage, that it improves with age, and generates no vermin.—We have had no opportunity of ascertaining the truth of this boasted superiority, and candidly submit the process to the decision of our economical readers.

Preservation of cheese.—Among the various productions of the vegetable kingdom, there are perhaps none better calculated for this purpose than the following: 1. The leaves of the yellow star of Bethlehem, ornithogalum luteum, L.; 2. The tutsan, or park-leaves, hypericum androsæmum, L.; and 3. The tender branches of the common birch tree, betula alba, L. The two first of which, in particular, have from experience been found to possess considerable antiseptic properties. They ought, however, to be employed only when moderately dry, in which state they should be placed upon, or at the sides of, the cheese, in an airy situation. The twigs of the birch are especially useful in preventing the ravages of mites.

Hard and spoiled cheese may be restored in the following manner: Take four ounces of pearl-ash, pour sweet white wine over it, till the mixture ceases to effervesce. Filtre the solution, dip into it clean linen cloths, cover the cheese with them, and put the whole into a cool place or dry cellar. Repeat this process every day, at the same time turning the cheese; and, if necessary, continue it for several weeks: thus, the hardest and most insipid cheese has frequently recovered its former flavour.

Although we have devoted much room and attention to this important subject, considered in an economical view, we shall be very concise on the physical properties of cheese. This substance, being the coarsest and most viscid part of the milk, is digested with difficulty; and therefore calculated only for the more vigorous stomach of the healthy and laborious. Hence, persons of a delicate organization, as well as the studious and sedentary, ought carefully to abstain from its use; for, when eaten new, for instance cream-cheese, it is apt to disagree, produce rancid eructations, and impair the digestive organs; when old, it has a remarkable tendency to putrify and taint the breath, even of the healthful. After dinner a very small quantity of sound old cheese may do no injury; but it neither assists the digestion of food, nor produces any additional nutriment, when the vessels already abound with alimentary matter.—Lastly, we advise those who know the value of health, and are enabled to procure more salutary food, never to make a meal upon bread and cheese alone. *Willich's Dom. Ency.*

CHE'ESECAKE. *s.* (from *cheese* and *cake.*) A cake made of soft curds, sugar and butter.

CHE'ESEMONGER. *s.* One who deals in cheese (*Ben Jonson*).

CHE'ESEPRESS. *s.* The press in which the curds are pressed (*Gay*).

CHEESE RENNET, in botany. See GALLIUM.

CHE'ESEVAT. *s.* The wooden case in which the curds are pressed into cheese (*Glanville*).

CHE'ESY. *a.* Having the nature or form of cheese (*Arbuthnot*).

CHEF D'ŒUVRE. See MASTER-PIECE.

CHEIRANTHUS, (*cheiranthus*, χείρανθος; from χειρ, a hand, and ανθος, a flower: so named

from the likeness of its blossoms to the fingers of the hand). Wall flower. Stock: July-flower. In botany, a genus of the class tetradynamia, order siliquosa. Germ with a glandular tooth on each side; calyx closed; two of the leaves gibbous at the base: seeds flat. Thirty-four species scattered over Europe, Asia, and Africa: of which two or three are indigenous to our own country. Those chiefly worthy of notice are:

1. C. anunus, or ten weeks stock; with leaves lanceolate, slightly toothed, obtuse, hoary; siliques cilindrical, acute at top; stem herbaceous. Petals emarginate.

2. C. cheisi, or common wall-flower; leaves lanceolate, acute, glabrous; stem shrubby with angular branches. The flowers of this species are recommended in some dispensatories, as possessing nervous and deobstruent virtues. They have a moderately strong, pleasant smell, and a nauseous, bitter and somewhat pungent taste.

3. C. incanus, or hoary cheiranthus. This is the common stock-gilly flower of the gardens. It is a native of Spain, with lanceolate leaves, very entire, obtuse, hoary; siliques truncate at top, compressed; stem somewhat shrubby.

The two last are very hardy ever-green biennials or perennials; but the first being an annual, must be continued by seeds sown every year; and even the two last from their propensity to degenerate, can only be preserved in full beauty by annual supply. The seeds should be chosen from such flowers as have five, six, or more petals; or from such as grow near double flowers. When fine doubles of the two last kinds are obtained, they may be multiplied by slips from the old plant.

CHEITORE, or Oudipour, one of the principal of the Ragpoor states in Hindustan Proper. It lies between 24 and 28 N. lat. and is tributary to the Mahrattas. Its chief town bears the same name, and is situated in Lat. 25. 21 N. Lon. 74. 56 E.

CHELÆ CANCRORUM. See Cancer.

CHELIDONIÆ INSULÆ, in ancient geography, rocks of the Mediterranean sea, upon the coast of Lycia in Asia Minor.

CHELIDONIUM, (*chelidonium*, χελιδωνιον; from χελιδων, the swallow. It is so named from an opinion, that it was pointed out as useful for the eyes by swallows, who are said to open the eyes of their young by it; or because it blossoms about the time when swallows appear. χελιδονιον μεγα). Celandine. In botany, a genus of the class polyandria, order monogynia. Calyx two-leaved; petals four; silique superior, two-valved, one-celled, linear; seeds numerous, crested. It is found wild on the wastes of our own country. The herb and root of this plant have a faint, unpleasant smell, and a bitter, acrid, durable taste, which is stronger in the roots than the leaves. They are recommended in icterus, cachexy chlorosis, dropsies, &c. This herb should be administered with caution, as it is liable to irritate the stomach and bowels.

Chelidonium minus. Pile-wort. The leaves and root of this plant, ranunculus ficaria; foliis cordatis angulatis petiolatis, caule unifloro, of Linnéus, are used medicinally. The former as antiscorbutics, and the latter as specifics, against the piles, applied in the form of poultices.

CHELMSFORD, the county town of Essex, situated in a beautiful valley, at the confluence of the rivers Chelmer and Can. It contained in 1800 about 3755 inhabitants: it has a market on Fridays. Lat. 51. 43 N. Lon. 0. 33 E.

CHELONE. In botany, a genus of the class didynamia, order angiospermia. Calyx five-leaved; corol ringent, inflated; rudiment of a fifth filament between the upper stamens glabrous; capsule two-celled. Four species; all American, herbaceous flowery perennials: hardy and propagable by seeds in most soils.

CHELONITES, a stone said to be found in the Indian tortoises, and to have the faculty of resisting poison. The word is formed from χελονη, a tortoise. Some confound the chelonites with the bufonites, or toad-stones.

CHELSEA, a large and populous village of Middlesex, seated on the river Thames, about a mile W. of Westminster, remarkable for a magnificent hospital for invalids. Here is also a large physic garden, belonging to the company of apothecaries of London, which covers almost four acres of ground.

Chelsea hospital, a noble edifice which was built by Charles II. on his restoration, and afterwards improved by his successor James II. Non-commissioned officers and private men, who have been wounded or maimed in the service, are entitled to the benefit of this hospital. There are in and out-pensioners belonging to the establishment, and the provisions of it extend to the militia under the following restrictions; serjeants who have served fifteen years, and corporals or drummers who have served twenty, may be recommended to the bounty. Serjeants on the establishment may likewise receive that allowance, with their pay in the militia. But serjeants who have been appointed subsequent to the passing of the 26th of George III. are not entitled to it under twenty years service.

CHELTENHAM, a town of England, in the county of Gloucester, celebrated for its medicinal waters, and within a few years become a place of great summer resort: and often honoured with the residence of the royal family. It has a weekly market on Thursdays. Lat. 51. 55 N. Lon. 2. 21 W.

Cheltenham water. A mineral saline water; the greater part of whose salts are of a purgative kind. It is also one of the strongest chalybeates. The iron is suspended entirely by the carbonic acid, of which gas the water contains about an eighth of its bulk; but from the abundance of earthy carbonats and oxyd of iron, not much of it is uncombined. Cheltenham water is used with considerable benefit in a number of diseases, especially of the chronic kind, and many of them highly difficult of cure; in glandular obstructions, and especially those that affect the liver and the other organs

connected with the functions of the alimentary canal, and in scorbutic eruptions of the skin. For a complete analysis of this water, as well as for a description of some of the interesting scenery about Cheltenham, the reader may consult Mr. Accum's paper in Nos. 121 and 122 of the Philosophical Magazine.

CHE'LY. *s.* (*chela*, Latin.) The claw of a shell-fish (*Brown*).

CHELYS, an ancient musical instrument of the pulsative kind.

CHEMICAL, relating to chemistry.

CHEMIN CREUX, a hollow way. See Ravin.

CHEMISE, the French word for that article of linen under dress which when worn by men is called a shirt, by women a shift. Some few modern English ladies, with an affected squeamishness of delicacy, restrict the term always so as to denote the article of female dress *chemise de femme*; but as every one knows what they mean by the expression, and we see no reason why every one should not know what they mean, we recommend the use of the old English term, and the abandonment of the corresponding French word.

Chemise, in fortification, the wall with which a bastion, or any other bulwark of earth, is lined for its greater support and strength: or it is the solidity of the wall from the talus to the stone-row.

Chemise (Fire), a piece of linen-cloth, steeped in a composition of oil of petrol, camphor, and other combustible matters, used at sea, to set fire to an enemy's vessel.

CHEMISTRY has been so often and so variously defined, that it is perhaps nearly as difficult to reconcile with each other the definitions which have been given as to determine which is best. In our opinion the field is still open; and we shall therefore at once proceed to observe that chemistry is the art or science of decompounding, and recombining matter agreeably to the laws of elective attraction. This definition embraces the whole range of the objects and experiments upon which chemistry is employed—the means it makes use of, and the end it has in view.

History of Chemistry.

Chemistry then, like many other branches of physics, is to be regarded both as an art and as a science. As an art it has existed, with greater or less approaches to perfection, almost ever since the earliest period of which we have any authentic record; but it does not appear to have assumed a scientific form till the middle of the seventeenth century. The various wants of man, even from the first ages of the world, naturally impelled him to attempt an alteration in the form of certain bodies, to adapt them to his purposes; and accordingly we find that a knowledge of the most important of the metals, and a rude outline of metallurgy, may be traced to the highest antiquity; for we read in the Mosaic history, Gen. iv. 22, that Tubal-cain, who was the son of Lamech and Zillah, was "an instructor of every artificer in brass and iron." The making of wine also, which is obviously a chemical process, is an invention not much posterior to the art of working metals, since we are informed that soon after the flood, "Noah began to be an husbandman—plan'ed a vineyard, and drank of the wine." Gen. ix. 20, 21. That the liquor which Noah drank had passed through the fermentive process, appears evident from the effect it produced upon him; for the unfermented juice of the grape has not the property of intoxicating. But though some of the operations of what is now called chemistry were known at these early periods, and probably before, yet the facts were unconnected with each other, no arrangements were attempted of these scattered portions of knowledge, no general principles were established, nor any rational deductions formed.

In different periods of its progress the subject we are now considering received different appellations, either according to the objects to which it might happen to be applied, the circumstances with which it was connected, or the whims and caprices of those by whom such epithets were imposed. 1. The hermetic and trismegistic art has been applied to chemistry, from Hermes or Mercury, otherwise called Thoth; and from Hermes Trismegistus, otherwise called Siphoas, both kings of Egypt, to whom the invention of the art has been successively ascribed, though apparently without much propriety, otherwise than as restorers or improvers. 2. A very ancient Greek denomination is ποιητικη, or ποιητικη τεχνη the founding or creative art, (*faciendi vim habens*); whence, according to Zozimus, the chemist himself was denominated ποιητης, *factor*, *effector*, *conditor*, *creator*, a moulder, fabricator, founder, or creator: nor has a more descriptive term been since invented to the present hour; excepting that, as the same Greek word was equally applied to the creative art of poetry, which has literally descended to ourselves, some confusion might result from its double reference and application. It is curious, however, to observe, that in one extensive and very important branch of chemistry, that of the *founder*, we still retain the original idea. 3. It was also termed chrysopoiesis, and the artists chrysopoietai, or gold makers. 4. Pyrotechnia, or the art of fire, is also a title of early adoption, because the first and almost the only operations of chemistry were performed by fire. 5. The Arabs gave it the name of alchemia or alchemy as though of divine origin, or as worthy of a descent from heaven. (For which see the article Alchemy.) The æra of this term, according to Boerhaave, is fixed at about four hundred years after Christ. 6. Paracelsus styles it the hysopic art, from that passage in the Psalms—purge me with hyssop and I shall be clean, Ps. li.; and the epithet seems to have been adopted by this eccentric man, because chemistry purifies or cleanses metals. 7. The spagyric art, from two Greek words signifying to separate and to unite. 8. Metallurgy, from its use in separating and working metals. 9. Docimasia, or the art of assaying metals, and metallic ores. To these might be added various other names, expressing some particular use to which, at different periods, it has been applied, as halotechny, lithurgy, phlogurgy, &c. &c. The etymology of its present name, chemistry, has been a subject of very diversified conjecture and opinion; some deriving it from the Hebrew chaman or haman, a mystery, whose radix is cham; others from the ancient name of Egypt cham or chemi, from Ham or Cham the son of Noah, by whom Africa was peopled after the deluge; while Bochart deduces it from the Arabic chema or kema, to hide. We

shall pass over the fabulous derivation of those who make the discoveries of the mysteries of chemistry (χημια) to have been the pretium amoris which angels paid to the daughters of men, as too fanciful to agree with sober reflection or authentic history. The earliest writings to which the word chemistry itself can be traced are those of Plutarch (see Boerhaave's history), the historian, who uses it as one of the sacred names of Egypt; and the first time it occurs as denoting the art we are speaking of, is in a Greek manuscript of Zozimus the Panopolitan, who appears to have lived in the fourth century.

To return to the history. From the time of Tubal-cain (who is supposed to be the same person as was afterwards deified by the heathens under the name of Vulcan), to that of Noah and the flood, we meet with no particular account, in the sacred writings, of any thing relating to our subject; though we may certainly infer from the circumstance of building the ark, and the plan of its construction, that Noah was acquainted with many of the discoveries and arts of the preceding ages. Indeed, there can be little doubt that in the space of 1656 years, from the creation of the world to the deluge, a great variety of economical studies must have been carried to a very considerable degree of perfection. The knowledge of many of these perished, perhaps, with the victims of divine wrath: it being scarcely possible for that single family which escaped the general ruin to have either practised or been even superficially acquainted with them all. The wine of which Noah drank after the deluge has been already mentioned: from this period the scripture history furnishes us with various intimations, more or less distinct, of the progress of the arts—as, the building of the tower of Babel; the "bread and wine" of Melchizedek; the gold and silver of Abraham; the 400 shekels of silver, "current money with the merchant" which he gave to Ephron for the field of Machpelah, and the scales or balance employed in weighing them; the pitcher of Rebekah, and the ear-rings, bracelets, and jewels, which Abraham's servant presented to her; the oil which Jacob poured upon the stone at Bethel; and other instances recorded in different chapters of the book of Genesis, from the eleventh to the thirty-fifth inclusive. Pursuing the history of Jacob and his family, we learn, that when Joseph, who had been sold captive by his brethren, was advanced by Pharaoh to the highest post of honour, he was "arrayed in vestures of fine linen," and had "a chain of gold about his neck," Gen. xli. 42; that when Joseph's brethren had been the second time to Egypt to buy food, and were about to return, his "silver cup," Gen. xliv. 2, was secreted in the sack of his brother Benjamin; plainly intimating that the Egyptians were skilled in the manufacturing of metals. We learn also that they were acquainted in some measure with medicinal chemistry, and in particular that the art of embalming bodies was familiar to them; for we are informed that Joseph commanded "the physicians to embalm his father," Gen. l. 2, 3, and the mourning that was customary on these occasions is even distinctly specified as to the time of its continuance.

In "all the wisdom of" these people, Moses was instructed; and an exhibition of his skill took place in the wilderness, after the departure of the Israelites from Egypt, when he burnt the golden calf which they had instigated Aaron to make for them to worship, reduced it to an impalpable powder, and rendered it potable. But this specimen has been overrated, by those who have quoted it to prove the astonishing proficiency of the Egyptians and of Moses in chemical knowledge and practice. "If," says Dr. Watson, "Moses had really reduced the gold of which the calf consisted into ashes, by calcining it in the fire, or made it any other way soluble in water, this instance would have been greatly in point; but neither in Exodus nor in Deuteronomy, where the fact is mentioned, is there any thing said of its being dissolved in water. The enemies of revelation, on the other hand, conceiving it to be impossible to calcine gold, or to render it potable, have produced this account as containing a proof of the want of veracity in the sacred historian. Both sides seem to be in an error; Stahl and other chemists have shown that it is possible to make gold potable, but we have no reason to conclude that Moses either used the process of Stahl, or any other chemical means for effecting the purpose intended.—He took the calf which they had made, and burnt it in the fire, and ground it to powder, and strewed it upon the water, and made the children of Israel to drink of it, Exodus xxxii. 20. Here is not the least intimation given of the gold having been dissolved, chemically speaking, in water; it was stamped and ground, or, as the Arabic and Syriac versions have it, filed into a fine dust, and thrown into the river of which the children of Israel used to drink: part of the gold would remain, notwithstanding its greater specific gravity, suspended for a time (as happens in the washing of copper and lead ores), and might be swallowed in drinking the water; the rest would sink to the bottom, or be carried away by the flux of the stream." *Chem. Ess.* vol. i.

There is no doubt, however, that the Egyptians had very much advanced the art of chemistry in many of its most essential operations; and there is great reason to believe that from them the Israelites obtained a knowledge of various processes which they afterwards employed in the structure of the ark and tabernacle, with their ornaments, and in the making of Aaron's garments, breast-plate, &c.; all which clearly indicate the existence of such arts as those of manufacturing metals; of weaving cloth; of dying leather red, and linen blue, purple, and scarlet; of distinguishing precious stones and engraving upon them; which, with several others connected with them, appear to have been practised at that time in a very eminent degree.

The early parts of the sacred history having furnished us with the detached notices of chemical inventions, which we have incorporated with the preceding remarks, leave us to pursue the enquiry through other channels. It ought not, however, to be omitted here, that the Phœnicians, who were descendants of Sidon the son of Canaan, were acquainted with the art of tinging garments with a purple-coloured matter, produced by a species of shell-fish. The invention of glass, artificial gems, perfumes, and balsams, has also been ascribed to them: and some writers have supposed that the Carthaginians and Greeks successively derived their chemical knowledge from the Phœnicians, and that it afterwards descended from the Greeks to the Romans. (See English Encyclopedia—PHŒNICIA.) Indeed, it is evident from the services which Hiram, king of Tyre, the

capital of Phœnicia, rendered to Solomon when he was about to build the temple, that these people were well skilled in working metals, dying, and engraving, and that they particularly excelled in hewing timber and stones for building. (See I. Kings v. 6. and 17.—Ibid vii. 14—40. II. Chron. ii. 7—14.) Of the early learning of the Greeks, Plato does not seem to have entertained a very high opinion; for he introduces an Egyptian priest addressing Solon in this language.—"You Grecians are ever children, having no knowledge of antiquity, nor antiquity of knowledge."

After all, then, Egypt is the country which must be regarded as the earliest and the chief, though not the exclusive, nursery of ancient learning and the arts; chemistry, in particular, was much cultivated there, when other branches of knowledge had passed into other parts of the world, and so much did the Egyptians venerate this favourite object of their pursuit, that Herodotus assures us that they had a temple in the city of Memphis consecrated to Vulcan, whom they honoured as the inventor of fire. The elder Pliny, who lived early in the first century of the Christian era, and who wrote a very elaborate work on natural history, in thirty-seven books, when speaking of the four periods of learning which had preceded the times in which he lived, reckons the Egyptian the first, assigning to it the precedency of all other nations. We have already mentioned two Egyptian philosophers, Thoth and Siphoas, bearing the common surname of Hermes or Mercury, of whom it is difficult to say more than that their history is so mingled with mythology and fable as to render it doubtful how far the accounts we have of them are to be considered as authentic. The latter Hermes is said to have lived 800 years after the other, and 1900 before Jesus Christ; and to have written a great number of books on natural philosophy, though it has been asserted that many of these were composed by persons assuming the name of Hermes, as in those times was not unfrequently the case. Democritus of Abdera, in Thrace, who lived about 500 years before Christ, travelled into Egypt, Chaldea, Persia, &c. and is said to have gained some skill in chemistry in the first of these countries. Though the son of a man whose opulence had enabled him to entertain Xerxes and all his attendants, he returned very poor into his native country, where he was kindly received, however, by his brother Damassus. Retiring to a garden near the walls of his native city, he employed himself in the study of plants and precious stones, and either laid the foundation, or very considerably advanced the superstructure, of the atomic philosophy, which was perfected about two centuries afterwards by Epicurus. Pliny was so amazed at the great knowledge Democritus had acquired, that he considered it as miraculous.

A considerable interval now takes place in our history, which we can no otherwise fill up than by observing that it is very probable the Egyptian priests continued to practise the various chemical arts which had been long understood in that nation, until the Roman emperor, Dioclesian, who had conquered them, ordered their books to be burnt, in the third century after Christ, that he might, by destroying the sources of their knowledge, reduce the people more easily and completely to subjection.

Soon after the period last mentioned, namely, in the fourth century, Zozimus, a Greek historian (from whom we have already quoted), wrote a number of tracts on chemistry, which, however, were never published; but being concealed in the French king's library, were at length discovered by Scaliger, by whom they were read, and afterwards by Borrichius, Conringius, and others. To Zozimus succeeded Garæus, Anastasius, and many other Greek writers, chiefly monks, of most of whom we know little, except that their manuscripts are preserved in the great libraries of Rome, Venice, and Paris. At length, chemistry having been driven by the hand of persecution, the revolutions of empire, and the horrors of war, from Egypt, Greece, and other countries, took refuge in Arabia, where it was for a long time cultivated with great assiduity, and, in many cases, with considerable success.

We now approach the reign of alchemy, so called by the Arabians, either to denote the grandeur of its object, or to express the presumption and conceit of those who pursued it. The word is compounded of the Arabic particle *al* (the) and *chemia*, denoting excellence and superiority; or otherwise, as some authors imagine, of *alchy*, heavenly, and *ma*, like; that is something god-like or divine. The objects of alchemy are twofold: 1. The art of making gold from any other metal, including the search after the philosopher's stone, which was to effect this transmutation; and, 2. the discovery of an universal medicine for the cure of all diseases to which the human body is liable. The first of these objects preceded the other by many centuries. Whether the Greeks invented, or received from the Egyptians, the doctrine concerning the transmutation of metals, or whether the Arabians were the first who professed it, Dr. Watson thinks is uncertain; but Boerhaave produces a passage from Æneas Garæus, before mentioned, implying that the Greeks were in possession of the art before any traces of it can be discovered among the Arabians. "Such," says he, "as are skilled in the ways of nature, can take silver and tin, and, changing their former nature, make them into gold;" though whether he asserts this of his cotemporaries, or their predecessors, is by no means certain. Be this, however, as it may, the passion for making gold, either by the transmutation of other metals into this, or by perfecting that coction which the alchemists fancied to be going on in the bowels of the earth, or by the application of that all-powerful stone, whose fancied virtues they extolled so highly, was continued for many centuries, notwithstanding the failures, the disappointments, and the losses which those who gave way to it uniformly sustained. This delusion, which seems to have commenced at least as early as the fourth century, appears to have reached its greatest height about the eleventh or twelfth, and continued to prevail with unabated energy till the sixteenth, when Kircher, Conringius, and others, successfully opposed it. Towards the end of the fifteenth century, an addition was made to the reveries of alchemy by the renowned Paracelsus, a Swiss physician, who, having substituted with good effect chemical preparations in the place of the Galenic pharmacy then in use, and having performed many astonishing cures, asserted not only the possibility of preparing an universal medicine, as Lully and others had done before, but affirmed, moreover, that he had discovered the means of preparing it. These pretensions, however extravagant, were admitted, without hesitation, by the alchemists, who, incorporating the doc-

trine of Paracelsus into their system, set out with fresh ardour in their chimerical pursuits. It must strike us of this age as a singular circumstance, that attempts to make gold and silver by alchemical processes was once so prevalent in England, as to render it necessary in the fifth year of the reign of Henry IV. (1404) to pass the following act of parliament: "None from henceforth shall use to multiply gold or silver, or use the craft of multiplication, and if any the same do, he shall incur the pain of felony;" and it must appear still more extraordinary if the reason which Dr. Watson, who quotes this act, states was suggested for passing it, be the true one, viz. that it was not an apprehension that men should ruin their fortunes by endeavouring to make gold, but a jealousy lest government should be above asking aid of the subject. This singular statute, which was conceived to operate as a discouragement to the melting and refining of metals, was afterwards repealed, though not before letters patent had been granted to several persons, permitting them to investigate the universal medicine, and perform the transmutation of metals. During the existence of alchemy a great number of authors appeared at different times in various parts of Europe, some of whom, though they retained the peculiarities and extravagancies of their system, developed a great many valuable facts and properties of matter which tended ultimately to the advancement of chemistry itself.

In Arabia we find in her list of chemists or alchemists, Geber, or Dschasar, born 702, died 765; Rhazes, or, properly, Mohammed Ebu, Sacharjah Abu Bekr Al-Rasi, in the tenth century; Avicenna, or Al Hussain Abu Ali Ben Abdallah Ebn. Sina, born 978, died 1036; Mesne, the younger, died 1028.

In France, Arnoldus de Villa Nova.

In Germany, Albertus Magnus, Basil Valentine, Oporinus, Van Helmont, Alexander Van Zuchten.

In Holland, John and Isaac Hollandus, Nic. le Febure, or Fevre.

In Switzerland, Paracelsus.

In Majorca, Raymond Lully.

In England, Roger Bacon, George Ripley, Dr. Dee, sir Edward Kelly, Mr. Boyle.

To these may be added, Joh. de Rupe Scissa, and Centivoglio, or Serenus, who came originally from Scotland. Of the principal of these we shall take a little farther notice, as it may help to illustrate the periods in which they lived, or the particular objects of their pursuit.

In the works of Geber, the Arabian, are contained such useful directions concerning the manner of conducting distillation, calcination, sublimation, and other chemical operations, and such pertinent observations respecting various minerals, as justly seem to entitle him to the character, which some have given him, of being the father of genuine chemistry; though, in one of the most celebrated of his works, he modestly acknowledges himself to have done little else than abridge the doctrine of the ancients concerning the transmutation of metals. Mesne, Rhazes, and Avicenna, who were physicians, and posterior to Geber, speak also of many chemical preparations, and establish the opinion that medical chemistry, as well as alchemy, was in those dark ages well understood by the Arabians. It is the opinion of Boerhaave that a passage in Geber, which, though written allegorically, was understood literally, gave rise in after ages to the idea of an universal medicine. Geber's words are these: "There is a medicine which cures all lepers or leprous persons;" and Boerhaave thus explains them. By attending to the Arabic style and diction of this author, which, according to the genius of that language, abounds in allegory, it will appear that by man he means gold, and by diseases or lepers, the other metals, which they imagined came short of the purity and perfection of gold. (Prolegom. 13.) We meet with no other writer of distinction till the twelfth century.

Albertus Magnus, born in the year 1200, a Dominican, or, as some say, bishop of Ratisbon, was so well skilled in philosophy as to be reputed a magician. He composed twenty-two folio volumes on different subjects, and in one of them he describes a number of alchemical processes. Roger Bacon, vulgarly called friar Bacon, was born in the year 1214, near Ilchester, in Somersetshire; he studied first at Oxford, and afterwards at Paris. After his return to Oxford he became celebrated as the author of several inventions, any one of which might well entitle him to immortality. He was acquainted with the camera-obscura, the telescope, and gun-powder, and made many improvements in mechanics and chemistry. So unenlightened was the age in which this great man lived, that, like the preceding writer, he was accused of magic, and imprisoned. He wrote many treatises, some of which are yet extant, and among them two small pieces relating to chemistry, in which he shows how imperfect metals may be ripened into perfect ones. He entirely adopts Geber's notion, that mercury is the common basis of all metals; an idea most curiously analogous to the results which have lately been offered by Mr. Davy, in his history of the decomposition of alkaline salts, and he supposed that sulphur was the cement; believing, that if we could but imitate nature's method of ripening lead, or any other metal, we might change it into gold. Boerhaave declares that he has traced in Bacon many operations and discoveries which Homberg afterwards published as his own.—Raymond Lully was born in the island of Majorca, in 1235, and studied at Paris. He is generally considered as the first author who treats alchemy expressly with a view to universal medicine. He was a man of great talents, and has left several books on alchemy, which contain some facts relative to the preparation of acids, of aquafortis, of phosphorus; and describe several properties of metals —Arnoldus de Villa Nova, or Villeneuve, in France, is by some called the master, and by others the disciple, of Lully. He was born about 1245. He was a great physician and chemist, and the alchemists respect him as one of their best writers. His writings were collected in a folio volume, under the title of Magistri de Villa Nova. He died in 1310. Johannes de Rupe Scissa was a Franciscan friar, and flourished about 1380. His works are voluminous and valuable. Being accused of magic, and thrown into prison, he pined away, and died of grief.—George Ripley, an Englishman, and monk of Britling, then comes next in order. He wrote much on the transmutation of metals; but in such an allegorical style, that when he alludes to the sickness and cure of metallic substances, as Geber had done, he was erroneously supposed to be referring to an universal medicine for curing the diseases of the human body. Basil Valentine, a Benedictine of Erfurt, in Germany, was skilled in medicine and natural history. He left an excel-

lent work on antimony, entitled Currus Triumphalis Antimonii, which contributed more than any thing else to the introduction of that most useful mineral into the regular practice of most physicians in Europe, although at the same time it gave occasion, in the hands of interested empirics, to many pernicious nostrums. This book describes a considerable number of antimonial preparations, some of which have been since offered to the world as new discoveries. John and Isaac Holland appeared about this time, and wrote on the various topics of chemistry with all the copious eloquence of orators. They published a small treatise on the philosopher's stone, which, they affirm, may be prepared from any body in nature. They furnish a great many experiments on human blood, of which later discoverers have availed themselves. Their principal work is on enamelling, of which art, according to Boerhaave, they were the inventors, as well as of that of colouring glass and precious stones by the application of thin metal plates. The famous Paracelsus was born at Zurich, in the year 1493. In him were united great talents with the most extravagant boasting, amazing success with repeated failures, and perseverance with impetuosity. Being the son of a physician, he became acquainted early in life with the principles of medicine, and attained, by travelling, the knowledge of metallic bodies. His fiery and enterprising genius soon struck out a new road in the art of healing, by which he performed many surprising cures. Having learned from Carpus, a chirurgeon at Boulogne, some of the properties of mercury, he applied, with great advantage, mercurial preparations in cases of the venereal disease, which appeared about that time, and baffled the remedies of ordinary pharmacy. His great success elated him beyond measure, and impelled him to exclaim incessantly against the Galenical or ancient pharmacy. The great eminence which he attained, induced the curators of the university of Basil to appoint him professor of medicine and philosophy: and here his extravagancies followed him; for in his very first lecture, in a fit of temporary madness, he publicly burnt the writings of the Greek and Arabian physicians, vaunting at the same time, that by his own preparations he could bestow immortality. His contemporaries he treated with the most illiberal insolence, telling them that the very down of his bald pate had more knowledge than all their writers, the buckles of his shoes more learning than Galen or Avicenna, and his beard more experience than all their academies. Having revived the doctrine of Lully and others concerning the universal medicine, he applied himself with the utmost eagerness to this favourite pursuit, and obtained a multitude of followers anxious to accompany him in his career of glory; but, unfortunately, while he was displaying the virtues of his nostrum, and pretending to be in possession of secrets able to lengthen out life to the age of Methusaleh, he sunk into an untimely grave at the age of forty-seven. The rage, however, which he had excited, did not cease with his life, but continued in full vigour many years after it might have been supposed his own example would have dispelled the illusion for ever. That such a great and irregular genius should have raised many friends to admire, as well as many enemies to revile him, is not a matter of surprise; and accordingly we find that while some consider him as a second Esculapius, others have supposed that he had more impudence than merit, and more reputation than success. Whatever may be his real character, it is certain that he was the means of attracting more general attention to chemical subjects, while those who attacked, and those who defended, his principles, rendered almost equal service to the cause of truth by the facts they discovered, or the errors they exposed.—Van Helmont, born at Brussels in 1557, followed in the steps of Paracelsus: he embraced his principles, and solemnly declared himself to be in possession of the universal remedy. It does not appear, however, from the actions of his life, that he had any confidence in his own pretensions: from what he relates of his sickness and its treatment, it is certain that he failed to resort to his boasted remedy. His theory of medicine is curious. "No poison," says he, "can act on a carcase; if, therefore, it have any effect, it is by means of life;" which life he calls archæus, and ascribes to it both understanding and knowledge. "If, now, any heterogeneous body happen to be present to the archæus, it rises into a fervour, endeavours to expel the hostile matter, and, in order to that, exerts all the force of the body. To cure any disease, therefore, is to pacify and compose this archæus; and as its office is to watch over the health and safety of the whole body, it is excited at the very shadow of the enemy, calls its forces to the charge, raises fevers, and destroys the whole body. The thing required, therefore, is such a remedy as may readily pacify and lay this unnatural fervour upon all occasions; and this is the universal remedy." From the time of Paracelsus and Van Helmont the writers on chemistry became so numerous, that Borilli, in 1653, enumerated no less than four thousand which had come to his own knowledge; and before the delusions of alchemy were completely dispelled, more than double that number had probably appeared: of these we shall only notice a few who principally conduced to the improvement of chemistry. Soon after the death of Paracelsus, the arts of mining and fluxing metals, which had been practised from the earliest times, but had never been scientifically treated, received great illustration from the works of Georgius Agricola, a German physician, born in 1494. The Greeks and Romans had left no treatise worth mentioning on the subject, and though a book or two had appeared in the German language, and one in the Italian, relative to metallurgy before Agricola published his treatise De Re Metalica, yet he is justly esteemed the first author of reputation in that branch of chemistry. By collecting all that was known before, by visiting all the mines, and conversing freely with the miners in Germany, he obtained a thorough knowledge of the whole process of metals; and from him many succeeding writers have freely borrowed. Lazarus Ercherus, or Erckern, assay-master general of the empire of Germany, followed Agricola in the same pursuit. His works were first published at Prague in 1574, and an English translation of them, by sir John Pettus, came out at London in 1683. He is very circumstantial in his descriptions, both of substances and operations, and always speaks as if he were sitting before the furnace, or working in the mine, and relating exactly what passed. The works of these two writers are still highly esteemed, and for a long time maintained the superiority which they deserved. Other writers, chiefly German, succeeded these, on metallurgic subjects; as, Schindler, Orschall, Henckell, Scluttec,

Cramer, Lehman, Gellert, &c. Germany, indeed, had for a long time been the great school of metallurgy for the rest of Europe; and it is no less certain that we owe the present flourishing condition of our mines, in great measure, to the wise policy of queen Elizabeth, who granted privileges to Houghsetter, Schutz, and other Germans, whom she invited into England to instruct her subjects in the art. Joh. Rudolph. Glauber, a chemist of Amsterdam, rendered an important service to his art, by examining the residue of operations which had hitherto been always thrown aside as useless; he discovered by this means the neutral salt, which bears his name, and the ammoniacal vitriolic salt, and explained the chemical processes necessary in preparing mineral acids. Under this period of our history we may also mention the following: Cassius, known for his precipitate of gold; sir Kenelm Digby, who believed in the sympathetic action of metals; sir Ed. Kelly and Dr. Dee, who jointly pretended, by the help of their powder of projection, to turn mercury into gold; Libavius, who has communicated his name to a preparation of tin; Kunckel, who enriched chemistry with many fine experiments, and to whom the discovery of phosphorus has been attributed, though the credit of the discovery seems rather to belong to the celebrated Mr. Boyle, who communicated his method of preparing it to the Royal Society, in whose Transactions it was inserted. Be this as it may, both Kunckel and Boyle deserve well of posterity; the one for his improvements in enamelling and glass making; and the other for the caution and accuracy with which he conducted his experiments, and for the discoveries and writings by which he contributed to the advancement of chemistry in England. Homberg, who was born at Batavia, in the island of Java, wrought for some time in the laboratory of Mr. Boyle, which was then considered one of the best schools of philosophy in Europe; after his settlement in France, he was chosen, in 1691, a member of the Academy of Sciences, and was put in possession of the laboratory which belonged to it; in 1702 he was admitted into the family of the duke of Orleans as his chemical preceptor, and furnished with the most magnificent laboratory chemistry had ever known. Here he pursued his favourite subject with the utmost ardour, and here he probably discovered the method of preparing the pyrophorus which retains his name. He never published any separate work; but several of his essays were printed in the Memoirs of the Academy. His mode of expression was simple, precise, and methodical; and he was as far from the natural ostentation of the alchemists, as from their mysteriousness and obscurity. Bohnius, professor at Leipsic, published an excellent treatise on acids and alkalies. Lemery had several valuable papers inserted in the Memoirs of the Paris Academy; and in 1675 appeared his accurate course of practical chemistry. Borrichius, a Danish physician and chemist, discovered and made known the manner of inflaming oils with the nitrous acid.

Of the authors above mentioned some were more deeply tinctured with the spirit of alchemy than others. In the writings of the latter part of this period, we may observe, upon the whole, a preponderance of rational enquiry over artifice and error; though even among some of the authors who are yet to be named we may discover certain vestiges of the delusion under which their predecessors more heavily laboured; so true is it that an obstinate and inveterate malady never disappears at once without leaving traces behind.

There is nothing, perhaps, in the history of the human intellect, more curious than the general and long-continued prevalence of alchemy in the minds of so many persons, and some of them undoubtedly men of real talent; but our limits forbid us to indulge largely in those reflections which press upon us on a retrospect of the period of which we have been treating. Taking the subject in all its connections and bearings, we cannot but affirm that the alchemists have retarded the progress of chemistry, though on many accounts they are entitled to esteem. In their writings the profoundest views of genius are frequently to be observed, but allied with the most extravagant ideas. The most sublime truths are degraded by applications of the most ridiculous nature; and the astonishing contrast of superstition and philosophy, of light and darkness, compels the reader to admire them, even when he cannot withhold his censure. Chemistry is indeed indebted to alchemy for some truths, and for several professors of the art; but the obligation is small in comparison to the mass of useful knowledge that might have been accumulated during the course of several centuries; if, instead of endeavouring to form the metals, the operations of chemists had been confined to examining their properties, simplifying the means of extracting and refining them, combining them together, and multiplying their uses and modes of application; and if, instead of wasting their time in vainly searching after the universal medicine, they had sought only to improve the art of healing by those aids which chemistry would readily have supplied.

The frequent disappointments which the alchemists experienced at length raised a suspicion of the solidity of their system and the wisdom of their expectations; and many powerful antagonists arose towards the middle of the seventeenth century, to whom rational chemistry has innumerable obligations. The most distinguished and successful of these authors were Athanasius Kircher, a celebrated jesuit, who was born about the year 1600, and wrote an excellent work entitled Mundus Subterraneus; and Hermanus Couringius, a learned physician, who was a few years posterior to Kircher. The scattered facts which had for ages been accumulating began now to be collected, examined, and compared, by men of genius sufficiently extensive to comprehend them all, to discover their principles, to observe their relations, to combine them into one body of rational doctrine, and to lay the true foundation of chemistry considered as a science.

James Barner, physician to the king of Poland, was one of the first who engaged in this department, by arranging the chemical facts then known, and accompanying them with observations, in his Philosophy of Chemistry. Bohnius also, whom we have named before, wrote a book on scientific chemistry, which was very favourably received, and was long the only elementary book on the subject. But it is to Joachim Becher, of Spires, who appeared about this time, that chemistry is particularly indebted. In his noble work entitled Physica Subterranea, he has collected all the chemical phenomena which were then known, and has described them with amazing accuracy. He has even foretold many of the discoveries which have been successively made since he wrote; such as the existence of aeriform or gazeous sub-

stances, the possibility of reducing animal bones into a transparent glass, &c. He withdrew chemistry from the too narrow limits of pharmacy; he shewed its connection with all the phenomena of nature; he explained the phenomena of fermentation and the laws of putrefaction; and by the deductions which he made from the whole, he gave rise to that theory which was amplified by his successor Stahl, and from him was received as the true doctrine among all the philosophers of Europe for the greater part of a century. G. Ernest Stahl, born in 1660, and physician to the late king of Prussia, wrote a commentary upon the work of Beccher. Possessed almost from his birth with a strong passion for chemistry, he applied to it the whole force of his superior genius. He persevered in reducing to certain general principles all the facts with which the subject had been enriched. He classed his materials with admirable order and method; he expressed himself in a language less enigmatical than that of his predecessors; and purged the science of that alchemic infection to which even Beccher himself was too much attached. The name of this philosopher, therefore, marks the commencement of a new era in the annals of chemical science; and will always be remembered in connection with the ingenious theory which it designates, and which, from its leading principle, is otherwise known as the theory of PHLOGISTON. (See that word.) He was the first who had a clear notion of chemical union, and gives many instances of double elective attractions: he died in 1704. After him followed Boerhaave, who, amidst his various engagements as a physician, found leisure to attend to chemistry, upon which he composed a very profound treatise, which has long been highly celebrated. The sections which treat of the four elements, as they were then considered, are masterpieces of their kind; and that on fire particularly was esteemed by Macquer so excellent and so complete that "the human understanding," he says, "can scarcely make any addition to it." This illustrious man, the honour of his country, of his profession, and of his age, threw light upon every subject which he treated. To him we owe the first rational analysis of vegetables, the most simple and resolvable of organical bodies. His "course of processes" by which he conducted his enquiries, not only developed many of the properties of vegetables, but also prepared the way for those more extensive and satisfactory investigations which have since taken place. The history of chemistry, which forms the prolegomenon to his treatise, is exceedingly valuable and interesting; it goes back to the first dawn of the art, and traces its progress in a very able manner through successive nations and periods; and fully exposes the views, pretensions, and absurdities of the alchemists, with the duplicity, evasions, and tricks to which the more violent and abandoned of that fraternity resorted; if the arrangement of the history were somewhat amended, its republication would be very desirable, as it well deserves a continuation to the present time. An English translation of this excellent treatise was published in 1727, by Dr. P. Shaw and Mr. Chambers.

Macquer contributed very essentially to the advancement of the science, as well by his ingenious enquiries and valuable discoveries, as by the publication of his Elements of Chemistry, and his excellent Dictionary, an English translation of which, by Mr. Keir, with copious notes, was published in 1777.

Bergman, a Swedish chemist, made several improvements in the analysis of matter, and employed that process of investigation more accurately and extensively than had before been done: he also examined with success a number of volcanic productions; and was the author of those tables of elective attraction which still bear his name.

Scheele, also a Swede, whom Dr. Thomson calls the "Newton of chemistry," though he only lived to the age of forty-four, ran through a career of as brilliant and important discoveries as ever distinguished the most aged and successful cultivator of the science. For an account of these discoveries, which are too numerous to be particularised here, we must refer to his name in this work, and to the various subjects which are there pointed out as having engaged his attention.

Dr. Watson's ingenious and elegant Chemical Essays, which made their first appearance in 1781, tended very much to diffuse throughout England a general spirit of enquiry and information on chemical subjects, by the perspicuous and pleasing manner in which these subjects were treated. Several new experiments are also detailed, and much valuable intelligence is communicated in these well-written and popular Essays.

Additions to the stock of chemical knowledge, and material improvements in the construction of apparatus and in the management of processes, were also respectively made by Margraff, Wallerius, Hoffman, Beaume, Pott, Newmann, Meyer, Born, Rouelle, Priestley, Kirwan, and many others whose labours will be noticed in their proper places. In the mean time, the different societies and academies, which, commencing with the Royal Society of London, were instituted for scientific and philosophical purposes, collected, and received from their respective members, a vast number of detached facts, observations and experiments, by which chemistry, in common with other branches of knowledge, was ultimately much benefited. See ACADEMY and SOCIETY.

It is, however, somewhat surprising, that, with all these advantages, the progress of chemical science should have been so slow since the time of Stahl, as appears from comparing the greatness of his claims with the few additions that have been made to his doctrine, prior to the middle of the eighteenth century. But the fact is, that Stahl was so completely occupied in establishing the existence of phlogiston, and in tracing it through its various combinations with other bodies, that he seems to have neglected or overlooked the influence of air in most of those phenomena which he ascribed to the energy of the inflammable principle; and his followers, though Scheele and others proposed some modifications of his opinions, were too much attached to his system to question its validity. Boyle, Mayow, and Hales, had already shown the necessity of air to animal life, and noticed the operation of that fluid in many chemical phenomena; and Dr. Priestley, by repeating a great part of Hale's experiments, and performing a number of new ones, discovered a variety of fluids, before unknown, which, though resembling common air in the gaseous form they exhibit, yet differ from it in their essential properties; in particular he extracted from metallic calces a species of air much purer than the atmospheric. Mr. Bayen, a chemist deservedly celebrated for the accuracy of his researches, had also examined the calces of mer-

cury, and found that they were reducible without phlogiston, and that during the process they emit an aeriform fluid in great abundance. Dr. Black traced the laws of latent heat, and discovered the carbonic acid. Franklin, Canton, and others, advanced the science of electricity, and drew lightning from the clouds; the properties of the atmosphere were examined with accuracy; and water, which had hitherto been considered as an elementary substance, was decomposed by Mr. Cavendish and M. Lavoisier, in consequence of experiments suggested or employed by Mr. Wartlire, Dr. Priestley, Mr. Watts, &c.

While some of these results embarrassed the votaries of the Stahlean theory, others of them served to construct and establish a theory of a very different nature. The doctrine of phlogiston was proved to be incompatible with a great number of very important phenomena, and the principle itself, which had never been shown to exist, but only assumed for the purpose of connecting and explaining the multiplied facts of the science, was ultimately and almost universally denied. The celebrated but unfortunate Lavoisier, endowed with the most happy genius for science, employed his own princely fortune and the liberal bounty of the French government in the prosecution of a series of beautiful and admirable experiments, from the results of which, in conjunction with the immense crowd of facts that had been previously collected, he deduced a new system, more comprehensive than that of Stahl, and vastly more conformable to the general mass of chemical phenomena. This system, which is founded on the affinities and combinations of oxygen with the various substances in nature, was at first scrupulously examined and violently opposed; but at length obtained a nearly universal reception, as the most rational and satisfactory that had yet been invented, though not entirely free either from difficulty or error. In honour of the inventor, this system has been called the Lavoisierian theory; in consequence of its opposition to that of Stahl, it has been termed the antiphlogistic theory; and from the continual use of the gasses in its construction, it is sometimes denominated the pneumatic theory; under the two former terms may be found a variety of other particulars connected with its nature and its history. Should any future discoveries, as is not unlikely, give rise to any modifications of this theory, it will still remain a splendid monument of the genius of its author; a man, whose brilliant talents and untimely fate reflect equal honour and disgrace on the country which gave him birth.

Dr. Gren, the author of an excellent treatise on chemistry in the German language, has adopted another system, which he calls the eclectic, and which he has formed by a union of the two just mentioned, resorting either to the phlogistic, or the antiphlogistic theory, as the nature of the fact he is explaining, or the circumstances of the case, may seem to justify his preference. He thinks, not only that it is possible to reconcile the system of Stahl with that of Lavoisier; but that, without a combination of the two, it is impossible to explain all the phenomena of chemistry. This opinion of Dr. Gren's, though not peculiar to him, does not appear to have met with a very extensive reception.

The number of able and successful cultivators of chemistry, in all its departments, has so much increased within the last thirty or forty years, that we can only mention the names of the most distinguished, and refer generally to the different articles in biography and chemistry which recount the lives of the dead, and the labours of the living, for more specific information.

Germans—Wenzel, Klaproth, Crell, Goettling, Wieglib, Tromsdorf, Westrumb, Gmelin, Werner, Jacquin, Weigel, Richter, Achard, Lowitz, Schwess, &c.

Dutch—Gaubius, Ingenhouss, Van Mons.

French—Reaumur, Hamel, Hellot, Sage, d'Arcet, Berthollet, Bosc d'Antic, Monge, Fourcroy, Chaptal, Adet, Hassenfratz, Durracq, Sequin, Vauquelin, Th. Saussure, La Place, Proust, &c.

Italians—Scopoli, Fontana, Landriani, Cavallo, Volta, Galvani, Spallanzani.

Swedes—Brandt, Wallerius, Cronstedt, Rinman, Scheffer, Gahn, Wilcke.

British—Watts, Wedgwood, Crawford, Kirwan, Pearson, Higgins, Hope, Chrichton, Bancroft, Blagden, Irvine, Nicholson, Hatchet, Henry, Howard, Hall, Hutton, Mushett, Chenevix, Wollaston, count Rumford, Herschell, Beddoes, Davy, Accum, Allen, Pepys, &c. In addition to those named in the course of the history.

American—Mitchell, Woodhouse, &c. &c.

In consequence of the multiplied discoveries of chemistry, which have revealed to us so many new substances, properties, and facts, the language of the science had become embarrassed and obscure, each discoverer holding himself at liberty to introduce what terms he pleased, without regard to propriety, analogy, or order. It became, therefore, a desirable object to reform the nomenclature, and to fix it upon principles which should be applicable to all the wants and diversities of the science; combining at once the essential qualities of perspicuity, uniformity, and method. This important undertaking was accomplished, in 1788, by the French chemists, De Morveau, Lavoisier, Berthollet, and Fourcroy; and as this reformed nomenclature has now, with a few occasional deviations, become the language in which all chemists express themselves, we shall for the most part adopt the terms it prescribes, referring for an account of the principles on which it is founded, and the improvements that have been made in it, to the article Nomenclature.

Chemical characters.—The substances employed in chemistry are numerous, and abbreviations or arbitrary signs have on this account been in use, by which to distinguish them from a very early period. Among the more ancient writers, especially the alchemists, these characters were adopted not merely for the sake of brevity, but chiefly perhaps for the purpose of secrecy, and of exalting the mysterious dignity of their science by veiling their meaning under rude and barbarous hieroglyphics. The moderns, however, in their revision of these characters have had in view the establishment of a universal chemical language, intelligible to the writers of all nations, and of every future age. In the principal characters of the ancients the seven metals first known were distinguished by the same marks as those applied to the seven planets by astronomers in general. Of the remaining characters of the ancients several were mere arbitrary signs, and others rude types or hieroglyphics, destitute alike of uniformity and meaning. Bergman improved this method of writing, by adopting simple characters; and by rendering them capable of combination and arrangement, he contrived to express compound substances with greater facility. After the reformation of the nomenclature, Messrs,

Hassenfratz and Adet, two French chemists, invented a new and more complete system of characters, which they intended should speak a language to be understood by the learned of all nations. In our explanation of this last system, we shall nearly follow what Mr. Chenevix has said in his judicious remarks upon chemical nomenclature.

There are six simple radical signs, which may be considered as so many genera.

The first genus is the zig-zag line, and is used to denote light. See Chemical signs, Pl. 45. No. 1.

The second genus is the straight line. It comprehends three species, characterized by its direction.

Sp. 1. A perpendicular line denotes caloric, 3.

Sp. 2. A horizontal line denotes oxygen, 2.

Sp. 3. An oblique line from right to left, nitrogen, 4.

The third genus is a crescent, which is the generic sign of simple conbustibles.

Sp. 1. With the horns inclined to the right, carbon, 5.

Sp. 2. The reverse of the former, hydrogen, 6.

Sp. 3. With the points upwards, sulphur, 7.

Sp. 4. The reverse of the latter, phosphorus, 8.

The fourth genus is a triangle. It comprehends the simple salifiable bases.

Sp. 1. With the point upwards, and the base horizontal, 9. the alkalies.

Sp. 2. With the point downwards, 10. the earths.

Each of the species of this genus comprehends several individuals, which are distinguished by inserting within the triangle the first letter of its name in the Latin language, or, if two species begin with the same letter, the first letter of the second syllable is added; thus, for potass P. soda S. baryta B. strontia St. lime C. magnesia M. glucina Gc. gadolina Gd. or Y. for yttria, alumina Al. zirconia Z. silica Sl.

The fifth genus is a circle, 11. It comprehends the metals; and the species are distinguished in the same manner as the former, by inserting within it the primary letters of the first and second syllables; thus, for gold Ar. platinum Pt. silver Ag. mercury H. copper Cp. iron Fr. lead Pb. tin Sn. zinc Z. antimony Sb. or At. bismuth B. cobalt Cb. nickel Nk. manganese Mg uranium U. titanium Tt. tellurium Tl. chromium Cm. arsenic As. molybdenum Ml. tungsten Ts. columbium Cl.

The sixth genus is a square: it comprehends all the unknown bases of the acids, and the bases of the compound oxids and the acids.

Sp. 1. A square with perpendicular sides, 12. It contains the unknown and compound acidifiable bases.

Sp. 2. A square with inclined sides, 13. It contains the compound oxides. The individuals of both species are distinguished as before.

All compound bodies are expressed by combinations of these simple characters. But as simple bodies are capable of uniting in various proportions, it becomes necessary that these proportions should be expressed; and relative position has appeared the most natural method of doing so. In general, when the proportion of any body in a compound is small, its sign is placed above, when large, below, as in 35. 36. 42. &c.

Caloric exists in all bodies: but, according to its relative quantity, they exist as solids, fluids, or gasses. To express the first state, it has not been hought necessary to introduce the sign of caloric; to express the second, it is placed above; and to express the third, below, as in the examples in the plate (22—32).

Oxygen also combines with many bodies, and in several proportions. The products resulting from these combinatious are either oxids or acids. The oxids may be characterized by affixing the sign of oxygen to the left side of the sign of the base, and the acids by affixing it to the right; and the greater or less degree of each may be marked by placing it above or below as in the example in the plate. In this we have deviated from the common tables of chemical signs, and we trust with propriety; for M. Chenevix has remarked of the system, that "One of its chief defects is the impossibility of marking, by any principles it points out, the difference of the metallic oxides. A circle, with the mark of oxygen at the top, is the only method of marking a metallic oxide; for if we put the mark of oxygen lower, it will then have the force of an acid, and we must not confound the situation of the signs to mark differences of states, or the whole system will become confused." But the alteration proposed enables us to mark no less than six states of oxygenizement. When the sign of oxygen is placed on the left, it implies that the compound is an oxide; if it be placed at top, it expresses the smallest degree of oxidizement; at bottom, the highest, and we have room for an intermediate one. The degrees of acidification are expressed in the same manner, except that the character of oxygen is placed to the right of the base. See 14—21. Proposal to the same effect has been made by Dr. Vandien in the Journ. de Physique, Vol. 56. and this coincidence is a proof that it is not arbitrary, but arises naturally from an attentive consideration of the subject.

The other primary combinations are expressed in the same way. When they unite only in one proportion, or when the proportions are indifferent, the signs are placed indifferently, though it would be better to place them in one determinate way; but when either of them is in excess, its sign is always placed below. Thus heavy hydro-carbonous oxide is expressed by placing the sign of hydrogen above that of carbon, 36, light hydro-carbonous oxide by reversing their position, 35. Glass is expressed by placing the signs of soda and silica side by side, 41; the liquor silicum, by placing the sign of the alkali under that of the earth, and adding the sign of fluidity above, 42.

The secondary compounds are expressed in a similar manner. The basis has been generally placed before the acid, to admit of the sign of the degree of acidification being added to the acid; and the same position fortunately admits of the sign of the degree of oxidizement being added to the oxide, when a metallic oxide forms the basis of the salt. The excess of acid or base is marked as before, by placing the acid or base below. With regard to the metallic salts, Mr. Chenevix has given some reasons for not introducing the sign of oxygen; but he himself has given the most powerful reason for introducing it, by proving, that the real difference between calomel and corrosive sublimate is in the state of oxidizement of the metal. The manner of marking the oxides proposed above enables us to express this difference distinctly, when the degree of oxidizement is ascertained.

Explanation of the Table of Chemical Signs.

Generic Signs.

No.				
1. Light.	5. Carbon.	9. Alkalies.	11. Metals.	12. Acidifiable bases, unknown or compound.
2. Oxygen.	6. Hydrogen.	10. Earths.		
3. Caloric.	7. Sulphur.			13. Compound oxides.
4. Nitrogen.	8. Phosphorus.			

Combinations of Oxygen.

No.		Oxides. 1	Oxides. 2	Oxides. 3.	Acids. 1	Acids. 2	Acids. 3
14.	Nitrogen.	Atmospheric air.	Nitrous oxide.	Nitric oxide.	Nitrous.		Nitric.
15.	Carbon.	Incombustible coal.	Charcoal.	Carbonic oxide.			Carbonic.
16.	Hydrogen.			Water.			
17.	Sulphur.			Oxide of sulphur.	Sulphurous.		Sulphuric.
18.	Mercury.	Black oxide.	Yellow.	Red.			
19.	Iron.	Green oxide.		Red.			
20.	Arsenic.			White.			Arsenic.
21.	Muriatic radical.				Muriatic.	Oxygenized muriatic.	Hyper-oxygenized muriatic.

Combinations of caloric.—22. Oxygen. 23. Nitrogen. 24. Sulphur. 25. Potass. 26. Acetic acid. 27. Ice. 28. Ammonia. 29. Sulphuric acid. 30. Mercury. 31. White oxide of arsenic. 32. Acetat of ammonia. The three columns represent the mode of characterizing the three states of aggregation of each of these substances.

Primary compounds.—33. Ammonia. 34. Carburet of iron. 35. Light hydro-carbonous oxid. 36. Heavy hydro-carbonous oxid. 37. Sulphuretted phosphorus. 38. Phosphuretted sulphur. 39. Amalgam of gold. 40. Alloy of silver and copper. 41. Glass. 42. Liquor silicum.

Secondary compounds.—43. Sulphat of potass. 44. Sulphat of potass. 45. Super-sulphat of potass. 46. Sulphat of alumina. 47. Super-sulphat of alumina and potass, alum. 48. Nitrat of potass. 49. Muriat of ammonia. 50. Hyper-oxygenized muriat of potass. 51. Tartrat of soda and potass. 52. Sub-borat of soda. 53. Sub-muriat of mercury less oxidized, calomel. 54. Muriat of mercury more oxidized, corrosive sublimat. 55. Green sulphate of iron. 56. Brown sulphat of iron. 57. Tartrat of antimony and potass. 58. Sub-acetate of copper. 59. Acetat of copper. 60. Soap of soda. 61. Soap of ammonia. 62. Hydroguretted sulphuret of potass. 63. Litharge plaster. 64. Ammoniuret of gold. 65. Fulminating gold.

Whether this chemical short-hand will ever be brought into extensive use, and whether, if it be, much material advantage would result from its adoption, are questions which we shall not take upon us to decide. We did not, however, think it right to omit this opportunity of presenting to our readers a slight sketch of its principles and design.

To those who are desirous of making further researches into the history of chemistry than our limited outline will enable them to do, we would recommend a perusal of Fresnoy's History of the Hermetic Philosophy; Olaus Borrichius de Ortu et Progressu Chemiæ; the Introduction to Senac's Chemistry; the first chapter of Boerhaave's Chemistry; the Discourse prefixed to Macquer's Chemical Dictionary; Bergman's Essay on the History of Chemistry; the first of Dr. Watson's Essays; &c, &c.; together with the various articles in this work which relate to the subject.

Utility of chemistry.—The uses of chemistry are innumerable. Embracing within its wide circumference every material substance, visible or invisible, which is within the reach, or subject to the experiment, of man, it renders the most important services to natural history, medicine, and the arts. It acquaints us with the intimate nature of bodies, their mutual relations and effects; it explains to us a great multitude of natural phænomena; it teaches us how to discriminate between the different qualities of substances, and how to adapt them to our wants; it increases our acquaintance with the beautiful system of laws that regulate the creation; it enlarges our minds by the views which it thus opens to us, mitigates the evils of life by guarding us against many of its dangers, and multiplies its comforts by furnishing us with numberless conveniences which we could not otherwise possess.

Apparatus of chemistry.—For the performance of

CHEMICAL SIGNS.

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chemical experiments, and the managment of the different processes, as well as for the reception and application of the various agents and products, a number of vessels and untensils are necessary; the principal of these are the following.

Alembics	Lutes
Aludels	Manometer
Areometer	Mattrass
Balances	Mercurial trough
Balloon	Morter and pestle
Barometer	Muffles
Baths	Pelican
Blow-pipes	Phials
Bolt-head	Pneumatic trough
Calorimeter	Pyrometer
Calcining pots	Receivers
Capsules	Registers
Crucibles	Retort
Cupels	Refrigeratory
Digestor	Reverberatory
Eolipile	Sand bath
Eudiometer	Spatula
Filter	Stills
Flasks	Syphon
Funnels	Testpapers
Furnaces	Thermometer
Gas-holder	Tubes
Gasometer	Vats
Gravimeter	Water-bath
Hygrometer	Worm tub
Jars	Woulfe's apparatus
Laboratory, portable	Nooth's do.
Lamps	Watts's do.
Lenses	

Descriptions of these may be found under their respective names.

In the conducting of experiments, nothing is of greater importance than a continual attention to neatness and order. Every jar or phial should have a label on it, denoting the substance it contains, unless when its nature is evident from inspection, and the date and object of the experiment. "I would caution the student," says Mr. Henry, "not to engage in many different experiments at once; the consequences of which are that the attention is distracted, and that many interesting changes pass unnoticed. It will contribute to form a habit of accurate observation, if the appearances that occur in experiments be regularly and distinctly noted down; and such an exercise will tend, also, to facilitate the acquirement of the art of describing chemical phænomena; to do which, with selection and precision, is far from being an universal talent. In advising an attention to neatness, however," continues Mr. H. "I am far from commending a frivolous regard to shew, or even too scrupulous a nicety about the appearance of apparatus. With the aid merely of Florence flasks, of common phials, and of wine glasses, some of the most interesting and useful experiments may be made; and in converting these vessels to the purpose of apparatus, a considerable saving of expence will accrue to the experimentalist." It is evident, however, that such a course of experiments thus conducted must be of a very limited nature; and in particular it may be observed that those beautiful and interesting experiments which relate to the gasses require an appropriate set of apparatus to perform them circumstantially, and exhibit to advantage the properties of those curious fluids, the discovery of which forms a new era in the history of chemical science.

Chemical substances.—The phænomena of chemistry depend upon those mutual attractions or affinities of different material substances, which are continually taking place, and which vary in their action and intensity according to the nature of the substances themselves, and the almost infinite variety of circumstances in which they may be placed. To acquire a knowledge of these mutual actions of bodies upon each other, and of the results that are produced by them, is the great object of chemical investigation. In our enumeration of the various substances which have occupied the attention of chemists, such properties of the principal of them will be noticed, as may serve to exhibit a general and at the same time a connected view of the leading facts and doctrines of the science; while, for a more extended and specific information, we must refer to the respective articles as they occur in the order of the alphabet.

I. *Caloric.*—Caloric, or matter of heat, the active priuciple which causes the sensation of heat, and gives rise to its innumerable phæomena, is diffused, as far as we can judge, throughout all nature; it separates the particles of bodies by insinuating itself between them, and diminishes their attraction; it dilates bodies, fuses solids, and rarefies liquids to such a degree as to render them invisible, and convert them into elastic, compressible, aeriform fluids. It increases the attraction of the particles which it separates for the particles of adjacent bodies; and is hence successfully employed to produce combinations, and facilitate reciprocal unions. Caloric has different attractions or different degrees of affinity for different bodies; and different bodies vary also in their capacity for receiving caloric. When bodies unite, either they lose caloric, which indicates that the new compound contains less than its component parts, and the heat is perceptible to our organs or our instruments by an increase of temperature; or the bodies which combine absorb caloric, and the new compound contains more heat than its parts did separately, and in this case the mixture becomes colder. Sometimes caloric adheres so forcibly to bodies, that it prevents their combining with others; its attraction for some substances is so great that it is very frequently employed with advantage for separating these substances from the compounds in which they enter, and for analysing compound bodies, as in distillation, and all decompositions by fire. Those bodies which absorb caloric more speedily than others are regarded as conductors of caloric; those which are most coloured are generally the best conductors. On the application of this principle depend a great variety of effects which are constantly occurring in chemical experiments and operations, in arts and manufactures, and in common life: they are too obvious and too great in number to need or allow of enumeration here.

II. *Light.*—Light, whether it be considered as a modification of caloric, or a separate principle, has so many distinct properties as to justify us in treating it by itself. It acts in four different ways with respect to the bodies with which it comes in contact. It is either, 1. totally reflected from their surfaces, and produces whiteness; or, 2, it is only partially reflected, whence arise different colours; or, 3. it is more or less completely absorbed, and occasions blackness; or, 4. it passes through bodies, and constitutes transparency. In its passage through transparent bodies, it experiences a refraction, or deviation from its direct course, which is in a direct ratio to the density of the body, if incombustible, and so much the greater also as they are combustible. Light, in refracting, is separated into an immense number of variously-coloured rays, among which seven are principally distinguished, red, orange, yellow, green, blue, indigo,

and violet. Light also acts chemically on substances; some acids are decomposed, many salts change their nature; the oxides of metals in general re-approach the metallic state; and vegetables become coloured, sapid, and inflammable; for while deprived of light, they remain pale and insipid, and are what the French writers call etiolated. Many of the effects of this element are also exposed to common observation.

III. *Atmospheric air.*—The diffusion of this substance universally around us, the necessity of it to our existence, and its influence on the phænomena of nature, concur in rendering it an object of very considerable importance. The air acts in a collective mass, by its weight, its moisture or dryness, its temperature, its elasticity, and by the dissolving power which it exerts on all natural bodies. Experiments made in contact with the air, differ widely in their results from those which are performed in vacuo; and it is generally necessary to ascertain the state of the barometer, thermometer, and hygrometer, in chemical experiments. Atmospheric air is sensibly the same with regard to its intimate qualities, in whatever part of the world we examine; its different degrees of salubrity arising from the extraneous particles which happen to be mixed with it in different situations. The two chief properties of this air are the support it administers to respiration and to combustion. Animals cannot breathe long, nor can a combustible body continue to burn without a fresh supply of this air, or a certain matter extracted from it. Experiments shew that a body burning in the air effects a real analysis of this fluid, absorbing a part of it, which is called vital air or oxygen gass, and which, while it maintains combustion, changes the nature of the burning body, and generally increases its weight. That portion of the atmospheric air which is not absorbed, is also a gaseous fluid, and is denominated azotic gas, or nitrogen; it is lighter than atmospheric air, extinguishes flame, and speedily kills animals; it is also one of the constituents of several compounds, as will be seen under its name. A small proportion of carbonic acid gass also enters into the composition of atmospheric air.

A combustible body which has burnt in atmospheric air, absorbing all the oxygen gass to which it is capable of uniting, can burn no longer in a fresh quantity of air; it has become incombustible and frequently saline. The oxygen becomes fixed in the burning body; and the caloric, which held the oxygen in the state of gass, being set at liberty, occasions the heat which always attends combustion. It is probable that the greater part of the light which constitutes flame is also separated from the oxygen that is absorbed; for 1st. combustible bodies afford much more flame when they burn in vital air alone than in atmospheric air; 2. there are combustible bodies which do not burn with flame except in vital air; 3. some burnt bodies lose their oxygen on the contact of light alone. To separate the oxygen from a burnt body is to perform an operation the reverse of combustion; this is called deoxydation or disoxydation, and takes place in the reduction of metals, and other similar processes. From the whole it appears that vital air is a basis solidifiable, ponderous, and acidifying, dissolved in caloric, to which it is indebted for its form of oxygen gass; and in this view, combustion consists of a more or less complete precipitation of oxygen from its dissolvent, and its fixation in the burning body. Oxygen has also a peculiar affinity for each distinct substance to which it may become united; by means of which degrees of affinity we are frequently enabled to transfer oxygen from a burnt body to a combustible one; thus iron, zinc, antimony, &c. burnt with flame, when heated with oxyd of mercury, from which they attract the oxygen, and contain it in a more solid form.

Among the elements of air, beside the three gasses we have mentioned, we must also consider water, which exists in it in a state of solution, or of a perfect invisible vapour: no portion of atmospheric air has yet been found which is entirely destitute of this fluid; and to its presence we must ascribe a share in the production of almost every phænomenon of nature or of art. We must also add to the constituents of atmospheric air, caloric, light, the electric and magnetic fluids, which are intimately blended with it, and are traversing it continually in all directions; these must undoubtedly possess some influence over several of its properties; but to what extent, or in what manner, this influence is exerted, our present knowledge will not enable us to determine.

IV. *Gasses, or aeriform fluids.*—Of these curious and important substances we shall only mention here their names, with their synonyms; descriptive accounts of them and their properties occur under their respective articles.

Ammonical gass, formerly termed	Alkaline air.
Azotic gass or Nitrogen	Phlogisticated air, mephitis, impure air, nitrogenous air.
Carbonic acid gass	Fixed air, solid air of Hales, cretaceous acid gass, aerial acid.
Carbonated hydrogen gass	Heavy inflammable air.
Fluoric acid gass	Sparry acid air.
Hydrogen or Hydrogenous gass	Inflammable air; phlogiston of Mr. Kirwan.
Hydrogenous gass of marshes	Mephitized inflammable air.
Muriatic acid gass	Marine air, acid air.
Nitrous gass	Nitrous air
Nitrous oxyd	Dephlogisticated nitrous air.
Olefiant gass	Oil-making gass
Oxygen gass	Vital air, pure air, dephlogisticated air.
Oxymuratic acid gass	Dephlogisticated marine air.
Prussic acid gass	Prussian air.
Sulphuric acid gass	Vitriolic acid air.
Sulphurated hydrogen gass	Hepatic air.
phosphorized hydrogen gass	Phosphoric air.

V. *Combustible Substances.*—Under this denomination are included all substances capable of combining more or less rapidly with oxygen, and disengaging from it caloric and light: these are divided into two classes, simple and compound.

1. Simple combustibles, are those which have not been hitherto decomposed by analysis, or formed by the union of other substances. Such are azot, hydrogen, carbon or diamond, phosphorus, sulphur, and metals.

Azot, the basis of azotic gass, unknown, however, in any other state than that of gass: it extinguishes combustion, kills animals; and forms one of the constituents of ammonia, of nitric acid, and of animal substances. It is one of the most feebly combustible bodies.

Hydrogen, one of the principles of water, is also unknown in a separate state; in that of gass, it is sixteen times lighter than common air. It is insoluble in most bodies; but dissolves sulphur, phosphorus, carbon, oils, &c. forming different gasses; and decomposes several acids and metallic oxyds.

Carbon, the purely combustible matter of charcoal, forming with oxygen carbonic acid, having a greater attraction for oxygen than any known substance, and depriving all other burnt bodies of this principle. It exists in abundance in animals and vegetables, constituting almost wholly the solid basis of the latter; is soluble in alkalies and hydrogen gass; unites with metals, particularly iron, with which it forms plumbago, &c.

Diamond, is now considered by chemists as pure carbon in a state of crystallization; but never yet imitable by human art.

Phosphorus, a white, transparent, crystallized, and extremly fusible substance. It burns, as it were spontaneously, at every known degree of temperature; at a few degrees above the freezing point, it emits a white flame, with a pungent odour, though but little heat, and forms phosphorous acid; at 167° and upwards it burns rapidly, with a vivid and very brilliant flame, without any perceptible odour, and forms phosphoric acid. It is never found pure in a native state: it unites with sulphur and metals, and is soluble in hydrogen gass. It is now found to exist in minerals and vegetables as well as in animal substances.

Sulphur, a yellowish substance, odorous, and electrical. It is found in the earth, in some waters, in animal and vegetable juices. It burns either in a gentle heat without inflaming, forming a red or brown oxyd; or slowly with a blue flame, and the formation of sulphureous acid; or rapidly with a white flame, producing sulphuric acid. Sulphur dissolves hydrogen, and forms with it an intolerably fetid and unwholesome gass: it combines with earths and alkalies, charcoal and phosphorus; with the latter it forms a transparent liquid, resembling an oil.

Metals are well known for their great ponderosity and lustre, and the ductility of several of them: they are fusible, crystallisable, and combustible; decompose water and several acids; unite with sulphur, phosphorus, carbon, and each other at different temperatures; and in their state of oxyds perform a double function, that of acids with earths and alkalies, and that of salifiable bases with acids.

TABLE of the METALS, arranged in the order of their Specific Gravity.

	Colour.	Spec. gr.	Hardness.	Fusing point.	Malleability.	Tenacity.
Platina,	White,	23·000	8	170+ W		274
Gold,	Yellow,	19·300	6½	32 W	282000	157
Tungsten,	Brown,	87·600	6			
Mercury,	White,	13·568		--39 F		
Palladium,	White,	11·5				
Lead,	Blue-white,	11·352	5½	540 F		18
Rhodium,	Grey,	11·3				
Silver,	White,	10·510	7	28 W	16000	187
Bismuth,	Whitish,	9·822	7	460 F		
Nickel,	White,	9·000	8½	150 W		
Copper,	Reddish,	8·870	7½	27 W		302
Nickeline,	Grey,	8·55				
Arsenic,	White	8·310	5	400 F		
Cobalt,	White	8·150	6	130 W		
Iron,	Blue-grey	7·718	9	158 W		549
Molybdena,	Grey	7·500				
Tin,	White	7·299	6	442 F	2000	31
Zinc,	White	7·190	6½	700 F		
Manganese,	White	7·000	9	160 W		
Antimony,	Grey	6·860	6½	809 F	0	
Tantalite,		6·500				
Uranium,	Grey	6·440	6		0	
Tellurium,	White	6·115		540 + F		
Titanium,	Red	4·2	9			
Cerium,						
Chromium,						
Columbium,						
Iridium,	White					
Osmium,						

To these may be added the two very singular metals discovered by Mr. Davy, in potash and soda:

Potasium,	White	·77—		60 + F		
Sodium	White	·9348		120 + F		

The specific gravity of the two last substances being not only smaller than that of the lightest minerals and earths, but lower also than that of water, some doubts arise as to the propriety of admitting them in the class of metallic bodies; but their other properties are so similar to those

of metals that Mr. Davy considers himself justified, notwithstanding their lightness, in classing them among these bodies, some of which he observes differ from each other in as great a proportion in this respect, as potasium and sodium differ from the lightest of the metals previously discovered.

All the metals were formerly supposed to be compound bodies, on account, perhaps, of the pulverulent nature of their calces or oxydes. Mayow was the first who appears to have suspected that they were simple substances; and subsequent examinations have placed the question beyond all rational doubt.

Metals are found chiefly in the bowels of the earth; though they sometimes occur on, or near, the surface. They are met with in different combinations with other matters, as sulphur, oxygen, and acids; sometimes they are united with each other, and in some few instances they are discovered in a pure metallic state. In their different states of combinations they are said to be mineralised, and are called ores: these ores occur principally in mountainous districts, and in the cavities of rocks. The metal is generally incrusted and intermingled with some earthy substance, termed its matrix. The art of describing ores, and of discriminating between them, will be treated under the term MINERALOGY; that of assaying or analysing them, under DOCIMASIA; and that of extracting the metals in the large way, for the purposes of commerce and of life, under METALLURGY. The utility of metals is inexpressible; they are the great instruments of human industry; serviceable in the highest degree and in all situations to mankind at large; and exceedingly interesting to the chemist and the natural philosopher on account of the curious properties they exhibit, the numerous combinations into which they enter, and the part which they perform in the great economy of nature.

V. *Compound combustibles*, are such as result from a combination of two or more of the preceding ones: thus the solutions of sulphur, carbon, phosphorus, and arsenic in hydrogen gass, are inflammable gasses; and the combinations of sulphur with phosphorus, of carbon with iron, of different metals with sulphur, phosphorus, and each other, are compound combustible bodies. Of this kind are almost all the combustibles we meet with in nature.

When the properties of compound combustible bodies are compared with those of simple combustibles, it appears that the former sometimes absorb oxygen with more avidity than if they were alone, as many metallic sulphurets, and alloys; at other times, on the contrary, we find them less ready to burn, on account of the strong attraction they possess for each other, which is the case in general with phosphorated metals. There are even some that are long unalterable in the air, appearing to have lost by their intimate combination the property of being combustible, which they exert only when strongly heated; as the carburet of iron, which is even employed with some success to prevent iron from contracting rust.

Hydrogen and carbon, very intimately united together in the capillary tubes of vegetables, and frequently containing small portions of earths, alkalies, acids, and especially oxygen, form bitumens, oils, and resins, which, though they have a tendency to burn and separate, preserve sometime the equilibrium of their combination, till a rapid increase of temperature, accompanied with the contact of air or water, puts an end to this equilibrium, by isolating their elements, and uniting them separately with oxygen. Accordingly the products of these compound combustibles are universally water and carbonic acid. It is the same with alcohol, and with ether, formed by modifications of the principles of vegetable matter, which, in their ultimate analysis, are nothing else than combinations of hydrogen and carbon with more or less oxygen and water.

A very great difference subsists between the various kinds of bodies with respect to their combustibility. Almost all combustible bodies burn in different ways; they all absorb different quantities of oxygen, not only according to the peculiar nature of each, but also to the temperature in which they are combustible and to the manner in which they are burned.

This exhibition of the different species of combustible bodies, and their principal characteristic properties, shows the part they act in the phænomena of the globe. It authorises us to divide almost all the productions of nature into two grand classes, one of combustible bodies, the other of bodies already burnt: in the masses and action of the former we discern the causes of inflammable meteors, partial heat, volcanoes, the perpetual alterations of the surface of the earth, &c.; in the existence of the latter, we perceive the source of the number and diversity of acids, saline compounds, oxyds, and metallic salts, which vary in a thousand ways the appearance of ores, their reciprocal decomposition, and their alterations by the action of water, air, and light; in fine, we discover in vegetables machines which nature has organised for the purpose of intimately combining several of those substances with each other, in order to form compounds more subservient to its grand designs, as they are less durable and permanent.

VI. *Water.*—This useful and important fluid, so abundant in nature, so curious in its properties, and so extensive in its application, was for many ages considered as a simple elementary substance, which entered into the composition of almost every other substance, but which was itself alike incapable of decomposition or formation. The researches of modern chemistry, however, have not only rendered this opinion doubtful, but have proved its fallacy, by ascertaining that water is composed of hydrogen and oxygen, in the proportion of fifteen parts of the former to eighty-five of the latter. According to the new theory, every combination of oxygen is either an oxyd or an acid; the latter possessing sourness of taste and the property of changing blue vegetable colours into red, while the former is destitute of these qualities: in conformity with this distinction, therefore, water has sometimes been termed an oxyd of hydrogen, and as such we are now to consider it.

In the general acceptation of the term, water may be said to exist in three states; that of a solid, which is ice; that of a fluid, its most common form; and that of vapour, or gass.

Water in the state of ice is crystallised, with more or less regularity and transparency. It becomes fusible at a temperature above 32° of Fahrenheit; but in melting it absorbs as much caloric as would raise the thermometer 112°, that is, such a quantity as would raise a body of water of equal bulk with itself to 144°; hence its capacity is not the same as that of fluid water. On the tops of many mountains, and near the poles of the earth, water perpetually continues in the state of ice. Besides the means which nature employs in the formation of ice, a number of artificial methods have been resorted to by chemists for the purpose of freezing water, by the separation of caloric: the principal of these me-

thods will be described in the article FREEZING MIXTURES. Fluid water, when pure, is insipid, colourless, destitute of smell, and about 850 times heavier than air.

It is named the grand menstruum of nature. Various phænomena depend upon its agency; and occasions for its use are continually presenting themselves to our observation. All the waters of the earth contain some substance or other, which detracts from their purity; those which flow in a sandy channel, and are exposed to the air, are more pure than those which traverse chalk, or gypsum, or stagnate on turf, bitumen, and ores of metals, or are confined from the contact of the atmosphere. There are several methods of correcting hard or impure water by means of acids, alkalies, acids, or charcoal; but the most certain mode is that of distillation, which is almost always employed in preparing water for chemical experiments. When the temperature of water is raised to 212°, it boils and becomes so much rarefied as to assume the aeriform state, and flies off in vapour. The expansive force which it thus acquires is exceedingly great; and when steam is produced in sufficient quantity and properly condensed and applied, it is capable of moving enormous weights; upon this property is founded the construction of steam-engines. As it is by the pressure of the air that water is retained in a state of liquidity, above the temperatnre of the freezing point, any cause which will diminish this pressure will increase the tendency of the water to boil; and hence when the circumambient air is rarefied, or its quantity decreased as in the receiver of an air-pump, vapour may be formed at a lower temperature than usual. Aqueous vapour loses its elastic form by cooling and compression, and is by these means decomposed; its basis parts from the caloric, and forms dew or fog. As air has the property of dissolving water, a quantity of that fluid is always in a state of solution in the atmosphere. Of all salts when crystallised, water constitutes a part, and indeed is necessary to their existence in this form; the quantity that is retained for this purpose is called the water of crystallisation.

Water may be decomposed by various chemical agencies, by electricity, and by galvanism; and the truth of the analysis by each of these methods is confirmed by the reproduction of water by the union of its constituent principles: this last purpose may be effected by firing a mixture of hydrogen and oxygen gasses in proper proportions. The methods employed in the analysis and the composition of water, together with the history of these interesting discoveries, will be noticed in their proper place. See WATER.

VII. *Acids.*—Of this important class of bodies the chief characteristic properties are, 1st. Sourness of taste; and, 2dly. the power of turning red most of the blue vegetable colours. These two properties are common to the whole class; but each individual acid is distinguished by other peculiar qualities. The ancients were acquainted with only four of the acids—the muriatic, the nitric, the sulphuric, and the acetous or vinegar; but the great improvements which the moderns have introduced, particularly the discovery and establishment of pneumatic chemistry, have not only thrown additional light on the nature of acids, but have very much increased their number.

According to the Lavoisierian theory, every acid is produced by the union of a certain base with the requisite proportion of oxygen, which is considered as the principle of acidity; yet, although most bodies are capable of becoming oxyds, there are only certain substances which will enter into that peculiar union with oxygen that produces acids, or that will imbibe a sufficient quantity of it for that purpose. The substances with which oxygen is combined to form the different acids are termed acidifiable bases or radicals. Most of these radicals are capable of uniting with two different quantities of oxygen to form acids, and some with three or more, thus producing as many degrees of acidification. These different states are expressed by corresponding changes either of beginning or of termination in the specific names of the respective acids. In the reformed nomenclature, every separate acid is designated by the name of its radical or base, or, when that is unknown, of the substance from which the acid is obtained. The first or weakest degree of acidification is denoted by the termination *ous*; the second state, forming a powerful acid, by *ic*; and still higher degrees of acidification are denoted by prefixing *oxygenated* or the abbreviation *oxy* to the former state; or, when occasion requires, even *hyperoxygenated* or *hyperoxy* may precede the common name. Thus we have sulphureous and sulphuric acid; *muriatic*, *phosphorous*, and *phosphoric* acid; *oxymuriatic* acid, and *hyperoxymuriatic* acid; in all which the different degrees of acidity are marked by the prefixes and the changes of termination. For other general properties of acids than have been mentioned, see the article; and for each individual acid, see its name.

The best classification of these bodies is, perhaps, that adopted by Fourcroy: he divides them into four classes with their respective genera and species. In the first class he places those acids which have known and simple radicals, or such as are formed by the union of indecomposable combustible substances with oxygen: these are all decomposable by the combustible bodies, which they burn with more or less rapidity, and are thus reduced to their radicals; they may also be decomposed completely by combining their radicals with oxygen. The second class contains acids whose radicals are unknown; and these are not susceptible of decomposition by combustible bodies, nor can they be formed by art. In the third class are placed those acids which have binary compound radicals; such are all vegetable acids, the common radical of which is a compound of hydrogen and carbon: these are all decomposable by a strong heat, and a sufficient addition of oxygen, and in this decomposition they afford water and carbonic acid; if dissolved in water, and exposed to a temperature of 53° or upwards, they are spontaneously decomposed; they cannot be decomposed by any combustible body known; and, lastly, they are convertible into each other, because they are all composed of the same principles though in different proportions. To the fourth class belong all acids of which the radicals are at least triple compounds: these are the animal acids whose radicals are combinations of carbon, hydrogen, and azot. These acids afford ammoniac when decomposed by fire, and yield prussic acid by a change of proportion in their principles. A general view of this mode of classification is exhibited in the following table, extracted from a late edition of Fourcroy's Chemical Philosophy.

and violet. Light also acts chemically on substances; some acids are decomposed, many salts change their nature; the oxides of metals in general re-approach the metallic state; and vegetables become coloured, sapid, and inflammable; for while deprived of light, they remain pale and insipid, and are what the French writers call etiolated. Many of the effects of this element are also exposed to common observation.

III. *Atmospheric air.*—The diffusion of this substance universally around us, the necessity of it to our existence, and its influence on the phænomena of nature, concur in rendering it an object of very considerable importance. The air acts in a collective mass, by its weight, its moisture or dryness, its temperature, its elasticity, and by the dissolving power which it exerts on all natural bodies. Experiments made in contact with the air, differ widely in their results from those which are performed in vacuo; and it is generally necessary to ascertain the state of the barometer, thermometer, and hygrometer, in chemical experiments. Atmospheric air is sensibly the same with regard to its intimate qualities, in whatever part of the world we examine; its different degrees of salubrity arising from the extraneous particles which happen to be mixed with it in different situations. The two chief properties of this air are the support it administers to respiration and to combustion. Animals cannot breathe long, nor can a combustible body continue to burn without a fresh supply of this air, or a certain matter extracted from it. Experiments shew that a body burning in the air effects a real analysis of this fluid, absorbing a part of it, which is called vital air or oxygen gass, and which, while it maintains combustion, changes the nature of the burning body, and generally increases its weight. That portion of the atmospheric air which is not absorbed, is also a gaseous fluid, and is denominated azotic gas, or nitrogen; it is lighter than atmospheric air, extinguishes flame, and speedily kills animals; it is also one of the constituents of several compounds, as will be seen under its name. A small proportion of carbonic acid gass also enters into the composition of atmospheric air.

A combustible body which has burnt in atmospheric air, absorbing all the oxygen gass to which it is capable of uniting, can burn no longer in a fresh quantity of air; it has become incombustible and frequently saline. The oxygen becomes fixed in the burning body; and the caloric, which held the oxygen in the state of gass, being set at liberty, occasions the heat which always attends combustion. It is probable that the greater part of the light which constitutes flame is also separated from the oxygen that is absorbed; for 1st. combustible bodies afford much more flame when they burn in vital air alone than in atmospheric air; 2. there are combustible bodies which do not burn with flame except in vital air; 3. some burnt bodies lose their oxygen on the contact of light alone. To separate the oxygen from a burnt body is to perform an operation the reverse of combustion; this is called deoxydation or disoxydation, and takes place in the reduction of metals, and other similar processes. From the whole it appears that vital air is a basis solidifiable, ponderous, and acidifying, dissolved in caloric, to which it is indebted for its form of oxygen gass; and in this view, combustion consists of a more or less complete precipitation of oxygen from its dissolvent, and its fixation in the burning body. Oxygen has also a peculiar affinity for each distinct substance to which it may become united; by means of which degrees of affinity we are frequently enabled to transfer oxygen from a burnt body to a combustible one; thus iron, zinc, antimony, &c. burnt with flame, when heated with oxyd of mercury, from which they attract the oxygen, and contain it in a more solid form.

Among the elements of air, beside the three gasses we have mentioned, we must also consider water, which exists in it in a state of solution, or of a perfect invisible vapour: no portion of atmospheric air has yet been found which is entirely destitute of this fluid; and to its presence we must ascribe a share in the production of almost every phænomenon of nature or of art. We must also add to the constituents of atmospheric air, caloric, light, the electric and magnetic fluids, which are intimately blended with it, and are traversing it continually in all directions; these must undoubtedly possess some influence over several of its properties; but to what extent, or in what manner, this influence is exerted, our present knowledge will not enable us to determine.

IV. *Gasses, or aeriform fluids.*—Of these curious and important substances we shall only mention here their names, with their synonyms; descriptive accounts of them and their properties occur under their respective articles.

Ammonical gass, formerly termed	Alkaline air.
Azotic gass or Nitrogen	Phlogisticated air, mephitis, impure air, nitrogenous air.
Carbonic acid gass	Fixed air, solid air of Hales, cretaceous acid gass, aerial acid.
Carbonated hydrogen gass	Heavy inflammable air.
Fluoric acid gass	Sparry acid air.
Hydrogen or Hydrogenous gass	Inflammable air; phlogiston of Mr. Kirwan.
Hydrogenous gass of marshes	Mephitized inflammable air.
Muriatic acid gass	Marine air, acid air.
Nitrous gass	Nitrous air
Nitrous oxyd	Dephlogisticated nitrous air.
Olefiant gass	Oil-making gass
Oxygen gass	Vital air, pure air, dephlogisticated air.
Oxymuratic acid gass	Dephlogisticated marine air.
Prussic acid gass	Prussian air.
Sulphuric acid gass	Vitriolic acid air.
Sulphurated hydrogen gass	Hepatic air.
phosphorized hydrogen gass	Phosphoric air.

V. *Combustible Substances.*—Under this denomination are included all substances capable of combining more or less rapidly with oxygen, and disengaging from it caloric and light: these are divided into two classes, simple and compound.

1. Simple combustibles, are those which have not been hitherto decomposed by analysis, or formed by the union of other substances. Such are azot, hydrogen, carbon or diamond, phosphorus, sulphur, and metals.

Azot, the basis of azotic gass, unknown, however, in any other state than that of gass: it extinguishes combustion, kills animals; and forms one of the constituents of ammonia, of nitric acid, and of animal substances. It is one of the most feebly combustible bodies.

Hydrogen, one of the principles of water, is also unknown in a separate state; in that of gass, it is sixteen times lighter than common air. It is insoluble in most bodies; but dissolves sulphur, phosphorus, carbon, oils, &c. forming different gasses; and decomposes several acids and metallic oxyds.

Carbon, the purely combustible matter of charcoal, forming with oxygen carbonic acid, having a greater attraction for oxygen than any known substance, and depriving all other burnt bodies of this principle. It exists in abundance in animals and vegetables, constituting almost wholly the solid basis of the latter; is soluble in alkalies and hydrogen gass; unites with metals, particularly iron, with which it forms plumbago, &c.

Diamond, is now considered by chemists as pure carbon in a state of crystallization; but never yet imitable by human art.

Phosphorus, a white, transparent, crystallized, and extremly fusible substance. It burns, as it were spontaneously, at every known degree of temperature; at a few degrees above the freezing point, it emits a white flame, with a pungent odour, though but little heat, and forms phosphorous acid; at 167° and upwards it burns rapidly, with a vivid and very brilliant flame, without any perceptible odour, and forms phosphoric acid. It is never found pure in a native state: it unites with sulphur and metals, and is soluble in hydrogen gass. It is now found to exist in minerals and vegetables as well as in animal substances.

Sulphur, a yellowish substance, odorous, and electrical. It is found in the earth, in some waters, in animal and vegetable juices. It burns either in a gentle heat without inflaming, forming a red or brown oxyd; or slowly with a blue flame, and the formation of sulphureous acid; or rapidly with a white flame, producing sulphuric acid. Sulphur dissolves hydrogen, and forms with it an intolerably fetid and unwholesome gass: it combines with earths and alkalies, charcoal and phosphorus; with the latter it forms a transparent liquid, resembling an oil.

Metals are well known for their great ponderosity and lustre, and the ductility of several of them: they are fusible, crystallisable, and combustible; decompose water and several acids; unite with sulphur, phosphorus, carbon, and each other at different temperatures; and in their state of oxyds perform a double function, that of acids with earths and alkalies, and that of salifiable bases with acids.

TABLE of the METALS, arranged in the order of their Specific Gravity.

	Colour.	Spec. gr.	Hardness.	Fusing point.	Malleability.	Tenacity.
Platina,	White,	23·000	8	170 + W		274
Gold,	Yellow,	19·300	6½	32 W	282000	157
Tungsten,	Brown,	87·600	6			
Mercury,	White,	13·568		--39 F		
Palladium,	White,	11·5				
Lead,	Blue-white,	11·352	5½	540 F		18
Rhodium,	Grey,	11·3				
Silver,	White,	10·510	7	28 W	16000	187
Bismuth,	Whitish,	9·822	7	460 F		
Nickel,	White,	9·000	8½	150 W		
Copper,	Reddish,	8·870	7½	27 W		302
Nickeline,	Grey,	8·55				
Arsenic,	White	8·310	5	400 F		
Cobalt,	White	8·150	6	130 W		
Iron,	Blue-grey	7·718	9	158 W		549
Molybdena,	Grey	7·500				
Tin,	White	7·299	6	442 F	2000	31
Zinc,	White	7·190	6½	700 F		
Manganese,	White	7·000	9	160 W		
Antimony,	Grey	6·860	6½	809 F	0	
Tantalite,		6·500				
Uranium,	Grey	6·440	6		0	
Tellurium,	White	6·115		540 + F		
Titanium,	Red	4·2	9			
Cerium,						
Chromium,						
Columbium,						
Iridium,	White					
Osmium,						

To these may be added the two very singular metals discovered by Mr. Davy, in potash and soda:

Potasium,	White	·77—		60 + F		
Sodium	White	·9348		120 + F		

The specific gravity of the two last substances being not only smaller than that of the lightest minerals and earths, but lower also than that of water, some doubts arise as to the propriety of admitting them in the class of metallic bodies; but their other properties are so similar to those

of metals that Mr. Davy considers himself justified, notwithstanding their lightness, in classing them among these bodies, some of which he observes differ from each other in as great a proportion in this respect, as potasium and sodium differ from the lightest of the metals previously discovered.

All the metals were formerly supposed to be compound bodies, on account, perhaps, of the pulverulent nature of their calces or oxydes. Mayow was the first who appears to have suspected that they were simple substances; and subsequent examinations have placed the question beyond all rational doubt.

Metals are found chiefly in the bowels of the earth; though they sometimes occur on, or near, the surface. They are met with in different combinations with other matters, as sulphur, oxygen, and acids; sometimes they are united with each other, and in some few instances they are discovered in a pure metallic state. In their different states of combinations they are said to be mineralised, and are called ores: these ores occur principally in mountainous districts, and in the cavities of rocks. The metal is generally incrusted and intermingled with some earthy substance, termed its matrix. The art of describing ores, and of discriminating between them, will be treated under the term MINERALOGY; that of assaying or analysing them, under DOCIMASIA; and that of extracting the metals in the large way, for the purposes of commerce and of life, under METALLURGY. The utility of metals is inexpressible; they are the great instruments of human industry; serviceable in the highest degree and in all situations to mankind at large; and exceedingly interesting to the chemist and the natural philosopher on account of the curious properties they exhibit, the numerous combinations into which they enter, and the part which they perform in the great economy of nature.

V. *Compound combustibles*, are such as result from a combination of two or more of the preceding ones: thus the solutions of sulphur, carbon, phosphorus, and arsenic in hydrogen gass, are inflammable gasses; and the combinations of sulphur with phosphorus, of carbon with iron, of different metals with sulphur, phosphorus, and each other, are compound combustible bodies. Of this kind are almost all the combustibles we meet with in nature.

When the properties of compound combustible bodies are compared with those of simple combustibles, it appears that the former sometimes absorb oxygen with more avidity than if they were alone, as many metallic sulphurets, and alloys; at other times, on the contrary, we find them less ready to burn, on account of the strong attraction they possess for each other, which is the case in general with phosphorated metals. There are even some that are long unalterable in the air, appearing to have lost by their intimate combination the property of being combustible, which they exert only when strongly heated; as the carburet of iron, which is even employed with some success to prevent iron from contracting rust.

Hydrogen and carbon, very intimately united together in the capillary tubes of vegetables, and frequently containing small portions of earths, alkalies, acids, and especially oxygen, form bitumens, oils, and resins, which, though they have a tendency to burn and separate, preserve sometime the equilibrium of their combination, till a rapid increase of temperature, accompanied with the contact of air or water, puts an end to this equilibrium, by isolating their elements, and uniting them separately with oxygen. Accordingly the products of these compound combustibles are universally water and carbonic acid. It is the same with alcohol, and with ether, formed by modifications of the principles of vegetable matter, which, in their ultimate analysis, are nothing else than combinations of hydrogen and carbon with more or less oxygen and water.

A very great difference subsists between the various kinds of bodies with respect to their combustibility. Almost all combustible bodies burn in different ways; they all absorb different quantities of oxygen, not only according to the peculiar nature of each, but also to the temperature in which they are combustible and to the manner in which they are burned.

This exhibition of the different species of combustible bodies, and their principal characteristic properties, shows the part they act in the phænomena of the globe. It authorises us to divide almost all the productions of nature into two grand classes, one of combustible bodies, the other of bodies already burnt: in the masses and action of the former we discern the causes of inflammable meteors, partial heat, volcanoes, the perpetual alterations of the surface of the earth, &c.; in the existence of the latter, we perceive the source of the number and diversity of acids, saline compounds, oxyds, and metallic salts, which vary in a thousand ways the appearance of ores, their reciprocal decomposition, and their alterations by the action of water, air, and light; in fine, we discover in vegetables machines which nature has organised for the purpose of intimately combining several of those substances with each other, in order to form compounds more subservient to its grand designs, as they are less durable and permanent.

VI. *Water.*—This useful and important fluid, so abundant in nature, so curious in its properties, and so extensive in its application, was for many ages considered as a simple elementary substance, which entered into the composition of almost every other substance, but which was itself alike incapable of decomposition or formation. The researches of modern chemistry, however, have not only rendered this opinion doubtful, but have proved its fallacy, by ascertaining that water is composed of hydrogen and oxygen, in the proportion of fifteen parts of the former to eighty-five of the latter. According to the new theory, every combination of oxygen is either an oxyd or an acid; the latter possessing sourness of taste and the property of changing blue vegetable colours into red, while the former is destitute of these qualities: in conformity with this distinction, therefore, water has sometimes been termed an oxyd of hydrogen, and as such we are now to consider it.

In the general acceptation of the term, water may be said to exist in three states; that of a solid, which is ice; that of a fluid, its most common form; and that of vapour, or gass.

Water in the state of ice is crystallised, with more or less regularity and transparency. It becomes fusible at a temperature above 32° of Fahrenheit; but in melting it absorbs as much caloric as would raise the thermometer 112°, that is, such a quantity as would raise a body of water of equal bulk with itself to 144°; hence its capacity is not the same as that of fluid water. On the tops of many mountains, and near the poles of the earth, water perpetually continues in the state of ice. Besides the means which nature employs in the formation of ice, a number of artificial methods have been resorted to by chemists for the purpose of freezing water, by the separation of caloric: the principal of these me-

thods will be described in the article Freezing Mixtures. Fluid water, when pure, is insipid, colourless, destitute of smell, and about 850 times heavier than air.

It is named the grand menstruum of nature. Various phænomena depend upon its agency; and occasions for its use are continually presenting themselves to our observation. All the waters of the earth contain some substance or other, which detracts from their purity; those which flow in a sandy channel, and are exposed to the air, are more pure than those which traverse chalk, or gypsum, or stagnate on turf, bitumen, and ores of metals, or are confined from the contact of the atmosphere. There are several methods of correcting hard or impure water by means of acids, alkalies, acids, or charcoal; but the most certain mode is that of distillation, which is almost always employed in preparing water for chemical experiments. When the temperature of water is raised to 212°, it boils and becomes so much rarefied as to assume the aeriform state, and flies off in vapour. The expansive force which it thus acquires is exceedingly great; and when steam is produced in sufficient quantity and properly condensed and applied, it is capable of moving enormous weights; upon this property is founded the construction of steam-engines. As it is by the pressure of the air that water is retained in a state of liquidity, above the temperatnre of the freezing point, any cause which will diminish this pressure will increase the tendency of the water to boil; and hence when the circumambient air is rarefied, or its quantity decreased as in the receiver of an air-pump, vapour may be formed at a lower temperature than usual. Aqueous vapour loses its elastic form by cooling and compression, and is by these means decomposed; its basis parts from the caloric, and forms dew or fog. As air has the property of dissolving water, a quantity of that fluid is always in a state of solution in the atmosphere. Of all salts when crystallised, water constitutes a part, and indeed is necessary to their existence in this form; the quantity that is retained for this purpose is called the water of crystallisation.

Water may be decomposed by various chemical agencies, by electricity, and by galvanism; and the truth of the analysis by each of these methods is confirmed by the reproduction of water by the union of its constituent principles: this last purpose may be effected by firing a mixture of hydrogen and oxygen gasses in proper proportions. The methods employed in the analysis and the composition of water, together with the history of these interesting discoveries, will be noticed in their proper place. See Water.

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The best classification of these bodies is, perhaps, that adopted by Fourcroy: he divides them into four classes with their respective genera and species. In the first class he places those acids which have known and simple radicals, or such as are formed by the union of indecomposable combustible substances with oxygen: these are all decomposable by the combustible bodies, which they burn with more or less rapidity, and are thus reduced to their radicals; they may also be decomposed completely by combining their radicals with oxygen. The second class contains acids whose radicals are unknown; and these are not susceptible of decomposition by combustible bodies, nor can they be formed by art. In the third class are placed those acids which have binary compound radicals; such are all vegetable acids, the common radical of which is a compound of hydrogen and carbon: these are all decomposable by a strong theat, and a sufficient addition of oxygen, and in this decomposition they afford water and carbonic acid; if dissolved in water, and exposed to a temperature of 53° or upwards, they are spontaneously decomposed; they cannot be decomposed by any combustible body known; and, lastly, they are convertible into each other, because they are all composed of the same principles though in different proportions. To the fourth class belong all acids of which the radicals are at least triple compounds: these are the animal acids whose radicals are combinations of carbon, hydrogen, and azot. These acids afford ammoniac when decomposed by fire, and yield prussic acid by a change of proportion in their principles. A general view of this mode of classification is exhibited in the following table, extracted from a late edition of Fourcroy's Chemical Philosophy.

TABLE OF ACIDS.

Classes.	*Genera.*	*Species.*	*Characters of the Species.*
1st Class. Acids with simple and known radicals. Twelve species.		Carbonic acid.	Product of the combustion of charcoal, gasseous, mephitic, nearly indorous, the most feeble, and most indecomposable of acids.
		Phosphoric acid.	Formed by phosphorus rapidly burned, very heavy, vitrifiable, very sour, not caustic, yielding phosphorus, with red charcoal.
		Phosphorous acid.	Less oxygenated, more phosphorated than the preceding, yielding a white smoke and a phosphoric flame, by heat.
		Sulphuric acid.	Sulphur totally burned, acrid, caustic, inodorous, charring organic compounds, very heavy, yielding sulphur with red charcoal.
		Sulphureous acid.	Odorous, gasseous, irritant, like sulphur, burning blue, discolouring and whitening vegetable and animal colours.
		Nitric acid.	One of the most decomposable, and therefore most variable in nature; by losing some oxygen it passes, 1st. to the state of nitrous gas, or azotic oxyd, insoluble in water, and reddening by the contact of air; 2d. to the state of azotic oxydule gass, soluble in water, not reddening in air, inflames charcoal, phosphorus, sulphur, oils, and some metals, destroys animal miasmata, and disinfects the most infected places.
		Nitrous acid.	It is nitric acid holding nitrous acid in solution, nearly absorbs its weight from it; then in a rutilant vapour more volatile than nitric acid.
		Arsenic acid.	Solid, fixed, vitrifiable, very poisonous, inodorous, arsenic completely burned.
		Arsenious acid.	Solid, volatile, odorous, and garlic-like when in vapour.
		Tungstic acid.	White, pulverulent, rough, growing yellow by nitric and muriatic acids.
		Molybdic acid.	Rough, little soluble, in white threads, becoming blue when deprived of oxygen.
		Chromic acid.	Yellow, little soluble, forming yellow, red, or orange-coloured salts.
2d Class. Acids with unknown radicals, but presumed simple. Four species.		Muriatic.	Gasseous, indecomposable, odorous, forming a white vapour, depriving many bodies of oxygen.
		Oxygenated muriatic.	Greenish yellow gass, fetid, thickening liquids and contracting animal organs, inflaming many combustibles, destroying almost all colours.
		Fluoric.	Gasseous, pungent, dissolving glass and silex, of which it precipitates a part by water.
		Boracic.	Solid, in crystalline spangles, fixed and fusible into glass, little soluble, little sapid, very feeble in its combinations.
3d Class. Acids with binary radicals. Twelve species.	1st Genus. Pure vegetable acids.	Succinic. Mellitic. Citric. Malic. Gallic. Benzoic.	
	2d Genus. Vegetable acidules.	Tartarous. Oxalic.	
	3d Genus. Factitious acids.	Camphoric. Suberic. Mucous.	
	4th Genus. Fermented acids.	Acetic.	

Classes.	*Genera.*	*Species.*	*Characters of the Species.*
4th Class. Acids with ternary radicals. Four species.		Amniotic. Sebacic. Uric. Prussic.	
Acids falsely admitted as particular acids, but found to belong to acetic acid.		Pyromucous. Pyrotartarous. Pyroligneous. Ciceric. Acetous. Formic. Bombic. Cruoric. Zoonic. Lactic.	

The present and former Names of Acids.

New Names.	*Old Names and Synonyma.*
Acetous acid.	Distilled vinegar.
Acetic.	Radical vinegar. Spirit of Venus.
Amniotic.	From the liquor of the amnios.
Arsenic.	
Benzoic.	Acid of benzoin. Salt of benzoin.
—— sublimated.	Flowers of Benjamin. Volatile salt of benzoin.
Bombic.	Acid of the silk worm.
Acetite of zinc.	Acetited zinc. Acetous salt of zinc.
Acid, acetous.	Distilled vinegar.
—— acetic.	Radical vinegar. Spirit of Venus.
—— amniotic.	
—— arsenic.	Arsenical acid.
—— benzoic.	Acid of benzoin. Salt of benzoin.
—— sublimated benzoic.	Flowers of benzoin. Volatile salt of benzoin.
—— bombic.	Acid of the silk worm. Bombycine acid.
—— boracic.	Volatile narcotic salt of vitriol. Sedative salt. Acid of borax. Boracine acid.
—— carbonic.	Gas sylvestre. Spiritus sylvestris. Fixed air. Aërial acid. Atmospheric acid. Mephitic acid. Cretaceous acid. Carbonaceous acid.
—— citric.	Lemon juice. Citronian acid.
—— fluoric.	Spathose acid.
—— formic.	Acid of ants. Formicine acid.
—— gallic.	Astringent principle.
—— lactic.	Sour whey. Galactic acid.
—— lithic.	Acid of the stone in the bladder. Bezoardic acid. Lithiasic acid.
—— malic.	Acid of apples. Malusian acid.
—— molybdic.	Acid of molybdena. Acid of Wolfram.
—— mucous.	
—— muriatic.	Acid of marine salt. Fuming spirit of salt. Marine acid.
Acid, oxygenated muriatic.	Dephlogisticated marine acid. Aërated marine acid.
—— nitrous.	Ruddy nitrous acid. Phlogisticated nitrous acid. Fuming nitrous acid. Fuming spirit of nitre.
—— nitric.	White nitrous acid. Nitric acid without gass. Dephlogisticated nitrous acid.
—— nitro-muriatic.	Aqua regia. Regaline acid.
—— oxalic.	Acid of sorrel. Oxalline acid. Saccharine acid. Acid of sugar.
—— phosphorus.	Volatile phosphoric acid.
—— phosphoric.	Phosphoric acid. Acid of urine.
—— prussic.	Colouring matter of Prussian blue.
—— pyro-ligneous.	Empyreumatic acid, spirit of wood.
—— pyro-mucous.	Spirit of honey, sugar, &c. Syrupous acid.
—— pyro-tartarous.	Spirit of tartar.
—— saccho-lactic.	Acid of sugar of milk. Saccho-lactic acid.
—— sebacic.	Sebaceous acid. Acid of tallow.
—— suberic.	Acid of cork.
—— succinic.	Acid of amber. Volatile salt of amber.
—— sulphureous.	Volatile sulphureous acid. Phlogisticated vitriolic acid. Spirit of sulphur.
—— sulphuric.	Acid of sulphur. Vitriolic acid. Oil of vitriol. Spirit of vitriol.
—— tartareous.	Tartareous acid. Acid of tartar.
—— tunstic.	Tungstic acid. Acid of tungsten. Acid of Wolfram.

Uric, obtained from urine, is the same as the lithic.

Zoonic, obtained from gluten, animal fibres, &c.

These two and thirty distinct acids, by their union with earths, alkalies and metals, form as many genera of compound or neutral salts, which contain about 380 species in the whole. See Section IX.

It may be observed in general of acids as distinguishable by their simple and compound radicals, that the former are not convertible into each other, because it is far beyond the power of art to change the nature of the radical; while the latter, which differ from each other chiefly in the proportions of the two or three principles which enter into their composition, have a tendency to undergo incessant changes, and from variations of temperature, humidity, &c. spontaneously pass into different states. Thus from the mere efforts of vegetation plants contain different acids at different periods of their growth; and solutions of vegetable acids in water change their colour and nature, yielding at last carbonic acid and water. Upon the whole it is probable that there still remain to be discovered not only the nature of several acids, with the composition of which we are unacquainted, but also perhaps a considerable number of new acids both in plants and animals.

VIII. *Earths and Alkalies.*—These matters which, in consequence of their capacity of uniting without decomposition to acids, and of forming with them compound or neutral salts, have, though not exclusively, been termed salifiable bases, are twelve in number: it is very probable, however, though these are all at present known, that there remain others which future observations or experiments will discover to us. Chemical writers are not agreed as to their distribution of these substances, some considering only three of them as alkalies, and the rest, with the exception of ammonia, as earths either perfect or alkaline; while others place no less than seven among the alkalies, and allow only five to remain among the earths. We shall adhere to the former arrangement, as being the most common; and especially since the properties of some of these bodies are as yet too little known to admit of their being classified with much precision: future discoveries will probably enable us to determine this point more completely.

The three alkalies are, potash, soda, and ammonia: the two first have been usually termed fixed, because they exist in a solid form at the temperature of the atmosphere, and require a great heat to be volatilised; the third is called volatile, because it naturally assumes the form of a gass.

Potash is dry, solid, white, crystallised; fusible at a temperature of 203°; very deliquescent, absorbing water with heat and a peculiar faint smell; of an acrid and caustic savour, corroding the skin; attracting carbonic acid from the air, combining with silex, with alumine, and with sulphur by fusion; uniting with some metallic oxyds and with all the acids. Soda resembles the preceding alkali in its external appearance, its causticity, and other properties, so closely, that it would be difficult to distinguish between them, if it did not form with acids salts very different from those formed by potash, and if it did not yield up the acids to the latter. These two alkalies are exceedingly useful in various arts and manufactures, in surgery and medicine, as well as in almost every department of chemistry. Formerly, and indeed till very lately, they were considered as simple substances; at least all attempts to ascertain their composition had proved fruitless: but professor Davy, by a series of most ingenious and decisive experiments, aided by the galvanic apparatus of the Royal Institution, has succeeded in decomposing them. According to his analysis, potash is composed of about six parts of a metallic basis and one of oxygen; and soda consists of seven parts of a nearly similar base to one of oxygen. The consequences resulting from this discovery will be noticed in their proper places. Ammonia differs from the preceding alkalies by its gaseous form in caloric, by assuming a liquid form when condensed in water, and by the impossibility of producing it in a solid form by any means yet employed. It has also a sharp and suffocating odour, is soluble in air, and is easily decomposable by the electric spark, and by other means. It is composed of about five parts of azot, and one of hydrogen.

The earths are barytes, magnesia, lime, strontian, silex, alumine, glucine, yttria, and zircon. Of these the first four are sometimes distinguished by the appellation of salino-terrene substances, or alkaline earths, as holding a sort of intermediate station between pure earths and alkalies.

Barytes, barytic earth, or terra ponderosa, was discovered by Scheele: it is of a greyish white colour, has a pungent, caustic taste, and is a violent poison: unlike the other earths, it is soluble in water, forms with sulphuric acid an insoluble compound, and tinges flame yellow. It is four times as heavy as water. Sometimes used in medicine, and but little in the arts. Magnesia is very soft, white, and light, with little taste or smell; unalterable in the fire, and almost insoluble in water. It is of great use in medicine, and is sometimes employed in chemistry and the arts. Lime is of a whitish colour, and a hot caustic taste; it forms salts with the acids; is incapable of fusion; gives out a large quantity of caloric when sprinkled with water, and absorbs carbonic acid from the atmosphere. Strontian is of a greyish white colour, of an acrid and alkaline taste, but less so than barytes; its solution in water crystallises; it gives a purple colour to flame. Silex, or pure flint, is insoluble in water, and in every acid except the fluoric; it endures alone the strongest heat without alteration, but mixed with potash or soda fuses in a strong heat, and forms glass. It is very useful in the form of sand as an ingredient in cements; in that of gravel for making roads, &c.; and enters into the composition of earthen-ware, porcelain, and many vitreous substances. In many chemical utensils it is of indispensable utility. Alumine, or pure clay, is soft to the touch, adheres to the tongue, will unite with most acids, acquires great hardness by heat, which contracts it. It enters, with silex, into the composition of bricks, earthen-ware, porcelain, crucibles, &c. Glucine is found in the emerald and beryl; it is, when separated, a soft, light, white powder, without taste or smell; adhesive to the tongue, infusible by heat, but soluble in the acids. Not used. Yttria, brought from Sweden, is an insipid white powder; forms sweet and coloured salts with the acids; is insoluble in the alkalies, fusible alone, but fuses when mixed with borax. Specific gravity 4.842, being greater than that of any other earth. Zircon, from a gem called the hyacinth in the island of Ceylon, is similar in its form of powder to glucine, is soluble in the acids, but not in the alkalies. Very scarce, and hitherto unapplied to any use.

Earths combine with each other two by two, three by three, and even in greater numbers, by processes unknown to us, which nature perpetually employs on a very extensive scale, to pro-

duce stones differing in hardness, texture, transparency, opacity, colour, form, &c. These processes have never been imitated by art, either from knowledge or accident: at least, similar results have not been produced, though approximations have been made to them in the cases of mortars and cements.

IX. *Combinations of Acids with Earthy, Alkaline, and Metallic Bases, and the Salts thence resulting.*—Acids unite without decomposition with earthy or alkaline salifiable bases, and with metallic oxyds; the salts thus produced are very numerous, and many of them are of considerable importance both in chemistry and the arts. These salts are in general easily composed by art, by the simple union of the acid with the basis; and they are frequently also found native. Their specific names are formed of two words; the first expressing the acid, and the second the base. The state of the acid is pointed out by the termination of the first name; and this also marks the correspondent variation in the state of the salt. Words ending in *at*, are employed when the salt contains an acid saturated with oxygen, or one that is denoted by the termination *ic*; thus, nitrats are formed by the nitric acid; and words ending in *it*, imply feeble acids, not saturated with oxygen, for which we use the termination *ous*: thus, the compounds of the nitrous acid are called nitrits, or nitrites.

As there are two and thirty distinct acids at present known, we may with propriety divide the compound salts into as many genera: we shall notice these genera alphabetically, and mention the principal species of salts comprehended in each.

1. *Acetats*, decomposable by fire, which sets at liberty the acid, nearly all deliquescent, very soluble in water, and evolving when decomposed by powerful acids, a pungent white vapour of acetic acid.

Acetat of alumine .... acetated clay, or aluminous mordant.
——— ammonia .... ammoniacal acetous salt—spirit of Mindererus.
——— barytes.
——— bismuth .... sugar of bismuth.
——— cobalt.
——— copper .... crystals of Venus—verdegris.
——— jargon.
——— iron .... martial acetous salt.
——— lead .... vinegar of Saturn—sugar of Saturn—extract of Saturn—sugar of lead, &c.
——— lime .... salt of chalk—salt of coral.
——— magnesia .... magnesian acetous salt.
——— mercury .... mercurial foliated earth.
——— potash .... arcanum tartari—secret foliated earth of tartar—essential salt of wine—digestive salt of Sylvius.
——— silver.
——— soda .... terra foliata mineralis—mineral acetous salt.
——— uranium.
——— zinc .... acetous salt of zinc.

These salts were formerly denominated acetites, from the supposition that they were formed by the acetous acid; but since it has been discovered that this is not a distinct acid, but only a modification of the acetic acid, the name has been very properly changed. This the reader is requested to remember when he refers to the article ACETITE in this work.

2. *Amniats*, very little known either in their generic character, or their specific ones.

3. *Arseniats*, are decomposed when heated with charcoal; and arsenic is sublimed, which is known by its smell resembling that of garlic.

Arseniat of ammonia.
——— copper.
——— iron and copper .... cupreous arseniat of iron.
——— potash.
——— ——— with excess of acid .... arsenical neutral salt of Macquer.

The other arseniats are very little known.

4. *Arsenits*, when dissolved in water precipitate arsenious acid by many other acids. The only species much known is

Arsenite of potash .... hepar, or liver of arsenic.

5. *Benzoats*, when strongly heated, blaze and exhale a sharp and pungent smell. They are of very little importance, and as they have no corresponding names in the old nomenclature, we need not specify them here. See BENZOAT.

6. *Borats*, are fusible into glass, and with most of the metallic oxyds, form glass of different colours.

Borat of ammonia .... sedative sal ammoniac.
——— antimony .... borax of antimony.
——— barytes .... ponderous borax.
——— lime.
——— magnesia.
——— potash .... vegetable borax.
——— soda, with excess of soda, or sub-borat of soda .... borax of commerce, tincal, chrysocolla.

7. *Camphorats* have a bitterish taste, are decomposed by heat, and burn with a blue flame before the blow-pipe. La Grange has examined them and developed many of their properties. They are at present of very little importance.

8. *Carbonats* are easily known by the immediate and rapid effervescence which they undergo by the

contact of almost any of the other acids. Most of them are decomposable by heat. These salts are of great importance; though they are the feeblest of all except the urats, in the connection of their principles.

Carbonat of alumine	cretaceous clay.
——— ammonia	ammoniacal chalk—concrete volatile alkali—ammoniacal mephite—sal volatile.
——— barytes	aerated ponderous earth—barotic mephite.
——— iron	aperient saffron of Mars—rust of iron—aerated iron.
——— lead	chalk of lead—spathose lead—mephite of lead.
——— lime	chalk—limestone—effervescent calcareous earth—calcareous spar—cream of lime.
——— magnesia	aerated magnesia—white magnesia—cretaceous magnesia—Kirwan's muriatic earth—Sentinella's powder.
——— potash	aerated vegetable alkali—fixed salt of tartar—vegetable fixed alkali—cretaceous tartar—subcarbonat of ditto—potash of commerce.
——— soda	aerated mineral alkali—natrum or natron—marine alkali—cretaceous soda—aerated soda—effervescent soda—chalk of soda—barilla.
——— zinc	chalk of zinc—aerated zinc—mephite of zinc.
——— strontian.	

9. *Chromats* are of a yellow or fawn colour; but are very little known or used.

10. *Citrats* are only known after their decomposition by stronger acids than the citric. They are not yet well understood. The principal species are citrat of ammonia, barytes, lime, magnesia, potash, soda, strontian.

11. *Fluats*, on contact with sulphuric, nitric, muriatic, or phosphoric acid, yield a white thick vapour which corrodes glass. They are not decomposable by heat. *Fluat* of lime is by far the most important species.

12. *Gallats* precipitate iron black from its solutions, and partly reduce the oxyds of silver, gold, and mercury.

13. *Malats*, almost all deliquescent; not to be known but by obtaining their acid separately by the aid of more powerful acids.

14. *Mellats* are very imperfectly known; but in some respects have been found to resemble oxalats.

15. *Molybdats*, very little known, and no otherwise distinguishable than by the separation of their acid, by other acids more powerful.

16. *Mucits* likewise nearly unknown.

17. *Muriats* yield a white, thick, and pungent vapour by concentrated sulphuric acid, and a greenish vapour by nitric acid. They are the most volatile, and yet the least decomposable by fire, of all the salts.

Muriat of alumine	argillaceous marine salt.
——— ammonia	sal ammoniac.
——— fuming, of antimony	butter of antimony.
——— sublimated, of arsenic	butter of arsenic.
——— barytes	barytic marine salt.
——— sublimated, of bismuth	butter of bismuth.
——— cobalt	sympathetic ink.
——— sublimated ammoniacal of copper	cupreous ammoniacal flowers.
——— gold	regeline salt of gold.
——— iron	marine salt of iron.
——— sublimated ammonical, or iron	martial ammoniacal flowers.
——— lime	fixed sal ammoniac.
——— mercury	calomel—mercurius dulcis.
——— oxymuriat of ditto	corrosive sublimate.
——— sweet sublimated ditto	aquila albe.
——— mercury and ammonia	sal alembroth.
——— mercury by precipitation	salt of Wisdon—white precipitate.
——— potash	febrifuge salt of Sylvius.
——— soda	common salt—marine salt.
——— fossil, of ditto	sal gem.
——— tin	salt of Jupiter.
——— concrete ditto	comeous tin—solid butter of tin.
——— fuming ditto	fuming liquor of Libavius.
——— sublimated ditto	butter of tin.
——— zinc	marine salt of zinc.
——— sublimated ditto	butter of zinc.

18. *Oxymuriats*, or more properly *hyperoxymuriats*, yield oxygen gas by fire, and are thus converted into common muriats. When mixed with combustibles they detonate with great violence by mere friction or percussion, and sometimes spontaneously. The chief of these are,

Hyperoxymuriat of barytes.
——— lime.
——— potash.
——— soda.

19. *Nitrats* are soluble in water and crystallize by cooling, detonate when heated to redness, yield nitric acid by sulphurics, and are decomposed by heat.

Nitrat of alumine........................... argillaceous nitre.
——— ammonia........................... ammoniacal nitrous salt.
——— barytes........................... barytic nitre.
——— copper........................... detonating salt.
——— mercury........................... mercurial nitre.
——— silver........................... lunar nitre.
——— melted ditto........................... infernal stone.
——— potash........................... nitre—saltpetre.
——— soda........................... cubic nitre—rhomboidal nitre.
——— glucine, strontian, yttria, &c. See NITRAT.

20. *Nitrits*, are nitrats partially decomposed; they yield a nitrous red vapour by sulphuric and nitric acids.

Nitrite of potash is the only one that has been much examined.

21. *Oxalats*, have the property of precipitating calcareous salts from their solutions, and have a tendency to form acidules that are soluble with difficulty.

Oxalat of ammonia.
——— barytes.
——— alumine.
——— lime.
——— potash, acidulous........................... salt of sorrel.
——— soda.

22. *Phosphats* are fusible into glass either opaque or transparent, phosphorescent at a high temperature, soluble in nitric acid, and precipitable from their solution by lime water.

Phosphat of ammonia.
——— barytes.
——— iron........................... iron of water.
——— lime........................... earth of bones—animal earth.
——— mercury........................... rose precipitate of Lemery.
——— magnesia.
——— potash.
——— soda.
——— soda and ammonia........................... native salt of urine—fusible salt of urine.
——— supersaturated, of soda........................... sal admirabile perlatum.
——— strontian, glucine, &c.

23. *Phosphits*, yield a phosphorescent flame when heated, in a strong fire give out phosphorus, being thus changed in phosphats. They are fusible into glass by a violent heat; and emit vapour on the contact of sulphuric acid, &c. Their savour is fetid. These salts differ little from those of the preceding genus, except by crystallizing differently. The principal species are those of barytes, lime, magnesia, potash, soda, and ammonia. They have been applied to no use.

24. *Prussiats* are so liable to variations, that it is difficult to characterise them; however, in general, they possess the property of forming a blue precipitate, with solutions of iron. The triple salts are the most useful and the best known.

Prussiat of ammonia.
——— barytes.
——— barytes and iron.
——— iron, blue........................... Prussian blue—Berlin blue.
————— white.
————— yellow.
————— green.
——— lime.
——— lime and iron.
——— magnesia.
——— magnesia and iron.
——— potash and iron........................... Prussian alkali—phlogisticated alkali—Prussian tert, &c.
——— soda.
——— strontian and iron.

25. *Sebats*, very little known as to their general or their specific character.

26. *Suberats*, require the same observation.

27. *Succinats*, yield by a strong heat a smell of burning amber; they are not known specifically, except on decomposition by stronger acids than that which they contain.

28. *Sulphats* have generally a bitter taste; are all decomposable by red hot charcoal, forming sulphurets; and are precipitable from fluids by a solution of barytes. They are very numerous and important: the principal are,

Sulphat of alumine........................... alum—argillaceous vitriol.
——— ammonia........................... Glauber's secret ammoniacal salt.
——— barytes........................... ponderous spar.
——— bismuth........................... vitriol of bismuth.
——— cobalt........................... ——— cobalt.
——— copper........................... ——— Cyprus—blue vitriol—blue copperas.
——— iron........................... martial vitriol—green vitriol—green copperas.
——— lead........................... vitriol of lead.

Sulphat of lime	calcareous vitriol—selenite—gypsum.
——— magnesia	Epsom salt—bitter cathartic salt.
——— manganese	vitriol of manganese.
——— mercury	——— mercury.
——— potash	vitriolated tartar—arcanum duplicatum—sal polychrest.
——— silver	vitriol of luna.
——— soda	Glauber's salt.
——— strontian.	
——— tin	vitriol of tin.
——— zinc	white vitriol—white copperas.

The sulphats of the other metals, as far as they were known, were also formerly called vitriols.

29. *Sulphits* have a brackish, disagreeable taste of sulphur; they burn by the contact of the sulphuric, nitric, or muriatic acid; and become sulphats by exposure to the atmosphere.

Sulphite of potash	sulphureous salt of Stahl.

The other sulphites may be considered as modifications of the sulphats: they have not been applied to any use.

30. *Tartrits* are easily decomposable by fire, and frequently form triple salts, by uniting with double bases.

Tartrit of ammonia	ammoniacal tartar.
——— lead	saturnine tartar.
——— lime	calcareous tartar.
——— potash	soluble tartar—vegetable salt.
————— acidulous	cream of tartar—crystals of tartar.
————— ammoniated	stibiated tartar—tartar emetic—ammoniated tartar.
————— ferruginated	chalybeated tartar—soluble martial tartar.
——— barytes, magnesia, &c. and of the metals.	

31. *Tungstats* have a metallic and caustic taste; they become yellow on contact with the nitric or muriatic acid, which decomposes them by attracting their base.

Tungstat of lime, the tungsten of mineralogists, is the only species found native; the others are formed by art; and have not yet been much examined, or applied to use.

32. *Urats*, or *Lithiats*, the weakest salts in nature in the mutual attraction of their principles, being decomposable by any of the other acids. They all yield prussic acid by distillation. The principal are

Urat of ammonia	found in urinary calculi.
—— potash	——— calculi of the bladder.
—— soda	——— gouty concretions.

Of all these salts, and others which are not specifically named, it may be observed that particular accounts either have been, or will be, given in this work under the articles which designate their respective genera.

X. *Mineral Substances.*—Minerals, in general, are those inorganic, inanimate substances, which constitute the solid mass, or rather, the external covering of our globe. The number of these bodies is very great, their character almost infinitely diversified, and their arrangement exceedingly irregular and confused; but they may all, perhaps, be comprehended under the names of metallic ores, stones, inflammable fossils, and saline bodies, with earthy, acid, or alkaline mixtures; existing either in stony or metallic aggregation, or in a state of comminution.

To describe these different bodies, to ascertain their physical and chemical properties, to discriminate accurately between them, and to arrange them so as to exhibit the whole in a regular and connected system, is the business of MINERALOGY; and to that article we refer our readers for the necessary information.

XI. *Vegetable Substances.*—The subject of vegetation has always been a difficult one; and though the habitudes of many plants have been discovered, and their composition ascertained, much investigation is necessary to enable us to point out with accuracy the process by which vegetation is conducted. The substances which constitute the texture of vegetables appear to be more complex in their nature than those of which minerals are composed; and though vegetables are extremely susceptible of decomposition, the art of man has never yet been able to form by synthesis the materials of which they are composed.

The immediate materials of vegetables, as far as they have been obtained by simple means which do not alter their nature, are the following:

1. Sap
2. Mucus
3. Albumen
4. Sugar
5. Starch
6. Extract or Extractive
7. Tannin
8. Gluten
9. Colouring matter
10. Fixed oil
11. Volatile oil
12. Wax
13. Camphor
14. Resin
15. Gum resin
16. Caoutchouc
17. Balsam
18. Wood
19. Suber
20. Vegetable acids.

These twenty substances are composed principally of only four, hydrogen, carbon, oxygen, and sometimes azot, combined in different proportions.

Alkalies, earths, and metals, have frequently been detected in vegetables, independently of their immediate principles.

When the organization of vegetables is destroyed in such a manner as that they are said to be

dead, a spontaneous decomposition takes place in certain circumstances, attended with fermentation, and issuing in putrefaction, and the total destruction of the vegetable texture.

The most material information which has been collected on these curious and interesting subjects will be detailed under the terms VEGETABLES and VEGETATION, and other articles immediately connected with them.

XII. *Animal Substances.*—Though the organization and functions of animals are still more numerous and complex than those of vegetables, it is a remarkable fact that not one elementary principle has been discovered in the former, which has not also been observed in the latter, plainly intimating, what indeed is obvious to common apprehension, that animal matter is really and ultimately formed from vegetables only.

Animal substances have been thus divided by Dr. Thomson.

Ingredients of animals.—Fibrin, albumen, gelatine, mucilage, basis of bile, urea, sugar, sulphur, oils, acids, alkalies, earths, metals.—*Parts of animals.*—*Solids.* Bones and shells, muscles, tendons, ligaments, membranes, cartilages, skin, brain and nerves, horns and nails, hair and feathers.—*Fluid.* Blood; its secretions, milk, saliva, pancreatic juice, bile, biliary calculi, synovia, semen, liquor of the amnios, urine, and urinary calculi. How far chemistry has been successful in detecting the nature and properties of these materials, may be seen under their respective names, and in the article ANIMAL MATTER. The principal elements of which these are composed are, azot, carbon, hydrogen, oxygen, lime, and phosphorus; several other substances enter in more minute quantities. Of these, azot predominates in animal matter, as carbon does in that of vegetables.

It would be impossible, within any reasonable limits, to specify the many valuable works which have appeared on the subject of chemistry within the last fifty years; but allusions will occur to most of them in the course of our work; and we shall not fail to notice, as we proceed, the principal discoveries that have been made in every part of the world, or to allot the honour of those discoveries to their respective authors.

The most comprehensive works on chemistry in our language are, Dr. Thomson's System, Mr. Accum's System, and Nicholson's Translation of Fourcroy's System of Chemical Knowledge.

CHEMNITZ, a town of Germany, in the circle of Upper Saxony, and marquisate of Meissen; containing three churches and an hospital: thirty-six miles W.S.W. Dresden, and thirty-two S.W. Meissen.

CHEMNITZ. See KAMNITZ.

CHEMOSH, in mythology, an idol of the Moabites, mentioned in scripture. (Numbers xxi. 29.) St. Jerom supposes that Chemosh and Baal-peor were both names of one and the same idol, not very different from Priapus, which is inferred from the indecent ceremonies used in their worship. Le Clerc, who takes this idol for the sun, deduces the name from *camosha*, an Arabic root signifying to be swift.

CHEMOSIS (*chemosis*, χημωσις, from χαι, to gape; because it gives the appearance of a gap or aperture). Inflammation of the conjunctive membrane of the eye, in which the cellular structure of the eye is distended with a florid fluid, and elevated above the margin of the transparent cornea.

CHENASI, one of the most extensive provinces of China, bordering on the great wall. It contains 8 cities of the first rank, and 160 of the second and third. Singan-fou is the capital.

CHENENGO, a river of United America, in the state of New York, which runs into the Susquehana, two miles S. Chenengo.

CHENOLEA. In botany, a genus of the class pentandria, order monogynia. Calyx five-parted; corolless; style filiform; stigmas two, reflected; capsule umbilicate, one-celled, one-seeded. One species only: a Cape shrub, with opposite, sessile, ovate-lanceolate leaves, convex, and silver-downy underneath; flowers axillary, solitary or in pairs.

CHENOPODIUM. Chenopody, goose-foot or wild orach. In botany, a genus of the class pentandria, order digynia. Calyx five-parted, inferior; corolless; seed one, lenticular, invested with the closed five-sided calyx. Twenty-six species scattered over the globe; the greater number of which, however, are common to our own country, and found on our dunghills, rubbish, road-sides, or salt-marshes. Of these the chief are:

1. C. bonus henricus. English mercury; formerly introduced into, but long since banished from the materia medica, with triangular-arrow-shaped, very entire leaves; compound and leafless spikes: found on the dunghills of our own country.

2. C. botrys. Jerusalem oak; with oblong sinuate leaves; naked, many-cleft racemes. South of Europe.

3. C. ambrosioides. Mexican tea-plant; with leaves lanceolate, toothed; racemes simple, leafy. Portugal and Mexico.

4. C. olidum: stinking orach; with very entire, rhomb-ovate leaves; and clustered racemes. Found on our road-sides, and by many botanists denominated c. vulvaria.

5. C. anthelmenticum. Vermifuge chenopody. A native of Pennsylvania, with leaves ovate-oblong, toothed; racemes leafless. Formerly used for the purpose of destroying worms in children.

CHEN-YANG, a district or department of Chinese Tartary, comprehending what was called Leao-tong, and extends as far as the great wall, which bounds it on the south; it is enclosed on the east, north, and west by a palisade, which is more calculated to defend the country against the noctural invasions of robbers than to stop the march of an army: it is constructed only of stakes, seven feet high, without any bank of earth, ditch, or the smallest fortified work: the gates are no better, and are guarded only by a few soldiers.

CHEN-YANG, the capital of the above district, is a large city encompassed by walls more than three leagues about. Lat. 41. 52 N. Lon. 123. 17 E.

CHEPSTOW, a town in Monmouthshire,

with a market on Saturdays. It was formerly a very considerable place. It is seated on the Wye, near its confluence with the Severn. Lat. 51. 52 N. Lon. 2. 36 W.

CHER, a department of France, including part of the late province of Berry. It receives its name from a river which rises in Auvergne, and falls into the Loire, below Tours.

CHERASCO, a considerable town of Piedmont, capital of a territory of the same name, with a strong citadel. Lat. 44. 45 N. Lon. 7. 58 E.

CHERBURG, a seaport of France, in the department of the Channel, with a late Augustine abbey. It is remarkable for a sea-fight between the English and French fleets in 1692, when the latter were beaten near Cape la Hogue. Lat. 49. 38 N. Lon. 1. 33 E.

CHEREM, among the Jews, is used to signify a species of annihilation. (See ANNIHILATION.) The Hebrew word cherem signifies properly to destroy, exterminate, devote, or anathematise.

CHEREM is likewise sometimes taken for that which is consecrated, vowed, or offered to the Lord, so that it may no longer be employed in common or profane uses. This word also denoted a kind of Jewish excommunication.

CHERESOUL, the capital of Curdistan, in Asiatic Turkey. It is th seat of a beglerberg. Lat. 35. 50 N. Lon. 44. 15 E.

CHERILUS, a Greek poet, the friend of Herodotus. He celebrated the triumphs of the Athenians over Xerxes: this poem was so greatly admired by his countrymen, that they rewarded him with a piece of gold for each verse.

To CHE'RISH. *v. a.* (*cherir*, French.) To support; to shelter; to nurse up (*Tillotson*).

CHE'RISHER. *s.* (from *cherish.*) An encourager; a supporter (*Sprat*).

CHE'RISHMENT. *s.* (from *cherish.*) Encouragement; support; obsolete (*Spenser*).

CHERLERIA. Mossy cyphel. In botany, a genus of the class decandria, order trigynia. Calyx five-leaved; petals five or none; nectariferous glands five, bifid, at the base of the stamens: capsule superior, three-valved, one-celled, many-seeded. One species: a native of the Alps; with stem tufted; leaves opposite, triangular-subulate, obtuse, three-nerved underneath; peduncles solitary, axillary one-flowered.

CHERMES. In zoology, a genus of the class insecta: order hemiptera. Snout placed in the breast, with three inflected bristles; antennas filiform, pubescent, longer than the thorax; wings four, deflected; thorax gibbous; hind-legs formed for leaping. Twenty-four species; inhabiting various trees and plants, and producing, by their punctures, protuberances and excrescences of various shapes and sizes; in which are frequently inclosed the eggs and insects in their several states. The larva is six-footed and apterous; the pupa is distinguished by two protuberances on the thorax, which are the rudiments of future wings. One of the largest knots or protuberances we find produced on the branches of trees is on the pinus abies by the insect thence denominated c. abietus. C. buxi, or the insect that infests the box-tree, with yellowish-brown wings and setaceous antennas, is remarkable for the saccharine excrement or mucus discharged from the anus of the larva and pupa, whitish in colour, softening under the touch, and not unlike manna. This substance is found in small white grains within the balls formed by the incurvings of the box leaves towards each other at their extremity, produced by the punctures of the insect. See Nat. Hist. Plate LVI.

CHEROKEES, a nation of Indians in the northern parts of Georgia, once powerful and flourishing, but now rapidly declining. They now have not more than 3000 warriors, and are becoming feeble and pusillanimous. They inhabit 43 towns.

CHERON (Elisabeth Sophia), an ingenious painter. She was the daughter of an eminent artist, and born at Paris in 1648. In 1672 she was admitted a member of the Academy of Painting, and the Academy of Ricovrato at Padua did her the same honour. She painted historical subjects in oil, but rather excelled in painting portraits in miniature enamels. She died in 1711.

CHERRY, in botany. See PRUNUS.

CHERRY (Barbadoes). See MALPIGHIA.

CHERRY BIRD. See PRUNUS.

CHERRY (Clammy). See CORDIA.

CHERRY (Cornelian). See CORNUS.

CHERRY (Dwarf). See LONICERA.

CHERRY (Hottentot). See CASSINE.

CHERRY (Winter). See PHYSALIS, SOLANUM, and ALKEKENGI.

CHERRY OF THE ALPS. See LONICERA.

CHERRY (Laurel). See PRUNUS, and LAURO-CERASUS.

CHE'RRY. *a.* Resembling a cherry in colour (*Shakspeare*).

CHERRY-BRANDY, a drink made of brandy with the addition of cherries. The cherries commonly used for this purpose are of the black kind: with those a bottle being half filled, is filled up with brandy, or spirits. The whole must now and then be shaken up, and in a month's time it will be fit for use. To sweeten it and improve the flavour, some persons put in sugar with a quantity of raspberries.

CHERRY-BAY. *s.* Laurel.

CHERRY ISLAND, a small island between Norway and Greenland, in the northern ocean. Lat. 74. 30 N. Lon. 20. 5 E.

CHE'RRYCHEEKED. *a* (from *cherry* and *cheek.*) Having ruddy cheeks (*Congreve*).

CHE'RRYPIT. *s.* A child's play, in which they throw cherry-stones into a small hole (*Shakspeare*).

CHERSON, the capital of New Russia, in the government of Catharinenslaf. It is a new town, erected by Catharine II. on the N. bank of the Dnieper. It is not yet very large; but the church and many of the houses are built

of stone in a pretty taste. In this place the deservedly celebrated philanthropist John Howard, fell a victim to his indefatigable exertions in the cause of humanity. Lat. 46. 5 N. Lon. 33. 10 E.

CHERSONESUS, a Greek word, signifying peninsula, or a tract of land almost encompassed by the sea.

CHERT, in mineralogy. See HORNSTONE.

CHERTSEY, a town of Surrey, with a market on Wednesdays. Lat. 51. 25 N. Lon. 0. 20 W.

CHERUB (plural, CHERUBIM); a celestial spirit, which in the hierarchy is placed next to the seraphim. (See HIERARCHY.) The figure of the cherubim was not always uniform, since they are differently described in the shapes of men, eagles, oxen, lions, and in a composition of all these figures put together. Moses likewise calls those symbolical or hieroglyphical representations, which were embroidered on the veils of the tabernacle, cherubim of costly work.—See Calmet's Dictionary: see also Parkhurst's Hebrew Lexicon, p. 339—356; where that elaborate though sometimes singular and fanciful writer, enquires: 1. What was the form of the artificial cherubs in the tabernacle and temple? 2. Of what these cherubs were emblems, and with what propriety? 3. What is the ideal meaning of the word כרוב? 4. He explains some other scriptural applications of words deduced from this. 5. He produces sixty heathen imitations of the sacred cherubic emblems.

CHERUBIM, was also the name of an ancient military order in Sweden; sometimes called the order of Seraphim.

CHERU'BIC. *a.* (from *cherub.*) Angelic; relating to the cherubim.

CHERVIL GARDEN. In botany. See SCANDIX.

CHERVIL (Wild). See CHŒROPHYLLUM.

To CHE'RUP. *v. n.* (from *cheer up.*) To chirp; to use a cheerful voice (*Spenser*).

CHESAPEAK, in America, one of the largest bays in the known world. Its entrance is between Cape Charles and Cape Henry in Virginia, 12 miles wide; and it extends 270 miles to the northward, dividing Virginia and Maryland. Through this extent it is from 7 to 18 miles broad, and generally about 9 fathoms deep.

CHESELDEN (William), an eminent anatomist and surgeon, was born at Burrow on the Hill, in the county of Leicester, descended from an ancient family in the county of Rutland, whose arms and pedigree are in Wright's History of Rutland. He received the rudiments of his professional skill at Leicester, and married Deborah Knight, a citizen's daughter, by whom he had one daughter. In 1713 he published his Anatomy of the Human Body, in one volume 8vo.; and in 1723, A Treatise on the High Operation for the Stone. He was one of the earliest of his profession who contributed by his writings to raise it to its present eminence. In the beginning of 1736, he was honourably mentioned by Mr. Pope; as "the most noted and most deserving man in the whole profession of chirurgery." He appears indeed to have been on terms of the most intimate friendship with Mr. Pope, who frequently, in his Letters to Mr. Richardson, talks of dining with Mr. Cheselden, who then lived in or near Queen Square. In February 1737, Mr. Cheselden was appointed surgeon to Chelsea hospital. He died at Bath, April 11, 1752, of a disorder arising from drinking ale after eating hot buns.

CHESHAM, a town in Bucks, with a market on Wednesdays. Lat. 51. 42 N. Lon. 0. 36 W.

CHESHIRE, a maritime county of England, bounded by Lancashire on the north; Shropshire and part of Flintshire, on the south; Derbyshire and Staffordshire, on the east and south-east; Denbighshire and part of Flintshire on the west, and the Irish sea north-west. It extends in length about 44 miles, in breadth 25: and contains about 676,000 acres of land, 61,000 of which (including woodlands) are uncultivated. It has about 191,750 inhabitants, supplies 885 men to the national militia, and sends 4 members to parliament. It is divided into 7 hundreds, containing one city, 11 market towns, and 101 parishes. The air of this county is temperate and salubrious. It is rich in pasture land, and its excellent cheeses are well known. The principal rivers are the Mersey, Weaver, Dee, and Dane. William the Conqueror erected this county into a palatinate, or county-palatine, in favour of his nephew Hugh Lupus, to whom he granted the same sovereign jurisdiction in it that he himself had in the rest of the island.

CHESNE (Andrew du), styled the father of French history, was born in 1584. He wrote, 1. A History of the Popes. 2. An History of England. 3. An Enquiry into the Antiquities of the Towns of France. 4. An History of the Cardinals. 5. A Bibliotheca of the Authors who have written the History and Topography of France. He was crushed to death by a cart, in going from Paris to his country-house at Verriere, in 1640.

CHESNUT. See CHESTNUT.

CHESS, an ingenious, scientific, and deeply interesting game played by two persons upon a square board, or draught-table, containing sixty-four rectangular chequers alternately black and white. There is no game perhaps that can boast so high an antiquity, or so general a study and practice: for though various games on cards may be more commonly pursued in some parts of Europe, chess is not only an object of extensive attention in Europe, but played with incomparably more frequency than any other game throughout every country in Asia. Its history has employed the pen of many eminent writers, and the genius of not a few of our best poets: and several of the greatest monarchs of ancient and modern times have sacrificed some of their most important hours to its bewitching attractions.

Al Amin, khalif of Bhagdat, was earnestly employed at this fascinating game when his capital residence was on the point of being taken by as-

sault. Tamerlane the Great is recorded to have been engaged at chess during the decisive battle between him and sultan Bajazet. King John of England insisted upon concluding his game before he gave audience to the deputies from Roan coming to apprize him that their city was besieged. Jusaf, king of Granada, was playing at the time an officer arrived to kill him: with difficulty Jusaf obtained permission to finish the game; before which event, however, intelligence was received of his brother's decease, and his own election to the throne. Nearly a similar case occurred to John Frederic, elector of Saxony, who, while playing at chess, was informed of a decree condemning him to death; he also unconcernedly went on with the game, and the decree was never executed. Ferrand count of Flanders was so often defeated at chess by his wife, that a mutual hatred took place between them. King James I. of England styled this game a philosophic folly: his son Charles I. was at chess when told that the Scots had finally determined upon selling him to the English, and he did not seem any way discomposed. Charles XII. of Sweden, when surrounded in a house at Bender by the Turks, barricaded the premises, and then coolly sat down to chess: this prince always used the king more than any other piece, and thereby lost every game, not perceiving that the king, although the most considerable of all, is impotent either to attack his enemies or defend himself, without the assistance of his people.

History of Chess.

There can be no doubt that the game of chess is of oriental origin: but from what part of the east it was directly imported into Europe has been a controversy of long standing. One of the best treatises upon the subject is that of sir William Jones, and his evidence goes to confirm the opinion that the original game of chess, or *chaturanga* (for there are several that bear this appellation) has been known and practised immemorially in Hindustan; and that from this word, under various corruptions, the name of the game is derived in modern languages. It literally means the four members of an army, elephants, horses, chariots, and foot soldiers, the same as exhibited at this day; but the game described by him is more generally known by the name of *chatúrájí*, or the four kings, since, he observes, "it is played by four persons representing as many princes, two allied armies combating on each side." The board is quadrilateral, with sixty-four checks as ours; but what forms one army with us, is divided in two, each having its king, elephant, horse, and boat, with four foot soldiers in front, placed at the left hand angle of each face of the board. The power of the king is the same as in the modern game; the elephant has the same powers as the English queen, moving at will in all directions; the horse the same as the modern horse or knight; the boat as the modern bishop, with the limitation of moving only two checks at once; the peon the same as the modern pawn.

This game is mentioned in the oldest law books, and is said to have been invented by the wife of Ravan, king of Lanca (i. e. Ceylon), in order to amuse him with an image of war (field war we suppose is meant) while his metropolis was closely besieged by Rama, in the second age of the world. Rama, according to sir William Jones's Chronology of the Hindus, appeared on earth at least three thousand eight hundred years ago; and this event happened in an early part of his career; yet notwithstanding these proofs of antiquity and originality, sir William Jones was of opinion that this rudimental and complex game is a more recent invention than the refined game of the Persians and Europeans: which he also states to have been certainly invented in India, and appears, therefore, to have considered the original. But to admit this would be to invert the usual order of things.

Two other distinctions are remarkable in the Hindu game; the introduction of a ship or boat amongst troops, &c. embattled on a plain; and the use of dice, which determine the moves, and, as sir William justly observes, exclude it from the rank which has been assigned to chess among the sciences.

In respect to the first of these distinctions, we cannot help suspecting a mistake in translating the passage. In explaining the meaning of chatur-anga, sir William says, "that is the four angas or members of an army, which are said in the Amaracosha to be, hasty áswa rat'ha pádátam, or elephants, horses, chariots, and foot soldiers." And the same names are used in India at this day.

Sir William notices the Chinese game as having a river described on the board, which the Indian board has not; and seems to infer that a ship or boat might be introduced in the Chinese game with propriety. Hence a query may arise whether the Indian board, now used, is the ancient one appropriate to the game, in which a boat is said to be introduced instead of a chariot; but in the Chinese game, of which we have an account before us, although what is erroneously termed a river is delineated on the board, yet there is no ship or boat among the pieces. Instead of a boat there is a chariot. How are we to reconcile these contradictions? —Perhaps, in the present state of our information, they are inexplicable. We shall nevertheless endeavour to lay before our readers as distinct an account as is in our power of the four principal games and modes of playing chess in Asia, viz. first, the one from the Purans, cited by sir William Jones; secondly, the Chinese, described by Mr. Irwin; thirdly, the Burmhan; and lastly, the Persian or present Hindustanee; comparing them with each other and the English game; and shall then leave it to some more fortunate enquirer to determine which is the original.

We have given precedence to the game said to be invented at Lanca, as it appears to be the most ancient, according to the authorities adduced by sir William Jones; and as the Persians admit that they received the game from India. We are indeed aware that the honourable Mr. Daines Barrington, in a paper published in the Archaeologia at London, gives it as his opinion that the Chinese game is the most ancient; and has taken great pains to disprove the Grecian claim to the invention. But according to the Chinese manuscript, accompanying Mr. Irwin's account in the Transactions of the Royal Irish Academy, the Chinese themselves invalidate their claim of originality, by fixing the date of the game, they assume the honour of inventing, 174 years before the Christian era.

Hindu or Ceylon chess.—In the Hindu game, we have already noticed that the principal distinction from the English consists in having four distinct armies and kings; each army composed of half the number of pieces and pawns used in one of ours: secondly, the elephant holds the station and power of our queen; thirdly, there is a boat instead of our castle, but with the powers of a bishop limited to a move of two checks at once; fourthly, the pawn

or peon has not an optional rank when advanced to the last line of the adversary's checks, merely assuming the rank of the piece whose place he possesses (excepting the boat); fifthly, the use of dice to determine the moves, as follows: when a cinque is thrown, the king or pawn must be moved; a quatre, the elephant; a trois, the horse; and a deux, the boat. Other variations are, that the king, elephant, and horse may slay, but cannot be slain; neither does it appear that the king can be removed to a place of more security, by any operation similar to the modern mode of castling. Indeed the mode of playing this game is very obscurely described: all that is known of it has already been published by sir William Jones, in the Transactions of the Society, to which we must refer those who require further information.

Chinese chess.—The game played by the Chinese is called Choke-choohong-ki, literally, the play of the science of war.

The piece which we call the king is named choohong, which may be rendered the scientific in war, or generalissimo; he moves one pace at a time in any direction, the same as our king, but within the limits of his fort.

The two pieces of next rank are called sou by the Chinese, which literally means bearded old men, or men of great experience in war. These are supposed to act as counsellors to the choohong, and have precisely the same moves and powers as the chekoy in the Burmha, or vizier in the Persian game, except that they are confined to the limits of the fort with the choohong.

The two pieces erroneously named mandarins by Mr. Irwin, are called tchong by the Chinese, which means an elephant; and they have precisely the same moves and powers as the elephant in the Persian and modern Hindustanee game; that is, they move diagonally in advance or retrograde, always two steps at a move: but the Chinese tchong has not the power of jumping over the head of an intermediate piece as the Persian elephant does; neither can it advance beyond the limits of its own section, for a reason I shall assign below.

The two pieces called mai by the Chinese mean horse or cavalry; they have precisely the same moves and powers as in the English and Persian games, and can advance into the enemy's section.

The two pieces called tche by the Chinese mean war chariots, and have the same powers and moves as the rooks or castles in the European game, advancing also into the enemy's section.

The two pieces called paoo by the Chinese mean artillery or rocket men. The paoo can move the whole range of both sections direct, transverse, or retrograde, like the English castle, and if any of the adversary's pieces or pawns intervene in the direct line, he takes the one immediately in the rear of it.

The pawns are called ping by the Chinese, meaning foot soldiers; they move one square or step at a time, direct in advance, and take their antagonist transversely to the right or left (not diagonally as ours do), nor have they the advantage of obtaining an advance rank as in the English game.

The blank space in the table is called hoa ki by the Chinese, which literally means a trench, and is understood to have been made for defence against an invading army. The horses, chariots, and foot soldiers are supposed to cross it by means of light bridges of planks; but these not being adequate to bear the bulk of the elephants, they are reciprocally obliged to remain within the limits of their respective sections.

In other respects the game is like the English one, and ends with destroying the forces on either side, or blocking up the choohong. The board is not chequered black and white, but merely subdivided, as in the diagram: the pieces are round counters of wood or ivory, with the distinguishing names wrote on them, half dyed red, and half black.

Burmhan chess.—The Burmhan name for the game of chess is chit-tha-reen, a term applied by them either to a generalissimo, or warfare; an etymologist perhaps might trace it as a corruption of the Sanscrit cha-tur-anga, the four angas, or members of an army.

Ming, or the king, has the same moves and powers as in the English game, except that he cannot castle, neither do they admit of what we call stale mate.

The chekoy, or sub-general, moves diagonally either way in advance or retrograde, but limited to one check or step at a move.

The rut'ha, war chariot, has exactly the same moves and powers as the English castle or rook.

The chein, or elephants, have five distinct moves: direct 1., diagonal in advance 2., diagonal retrograde 2., but limited to one check or step at a move; they slay diagonally only; the move direct in advance being only intended to alter the line of their operations, so that they may occasionally have the powers of our king's or queen's bishop.

The mhee, or cavalry, have exactly the same moves and powers as in the English game.

The yein, or foot soldiers, have the same moves and powers as in the English game, except that they are limited to one check or step at a move, and that the right hand pieces only are susceptible of promotion to the rank of chekoy (in the event of his being taken). It is not necessary for this promotion that they should have advanced to the last row of the adversary's checks, but to that check which is in a diagonal line with the left hand check in the last row of the adversary's section: consequently, the right hand pawn or yein, according to the diagram, will have to advance four steps to obtain the rank of chekoy; the 2d yein, 3 steps; the 3d yein, 2 steps; the 4th yein, 2 steps; and the 5th yein, 1 step.

Although the array of the battalia is generally in one way, yet the Burmhas admit of great variations; each party being allowed to arrange their pieces ad libitum; that is to say, they may strengthen either wing, or expose the king, according as they estimate each others abilities, or as caprice or judgment may influence them. In some respects this is tantamount to our giving a piece to an inferior player, but the variation is only to be understood of the pieces, and not of the pawns.

This liberty, added to the names and powers of the pieces, gives the Burmhan game more the appearance of a real battle than any other game. The powers of the chein are well calculated for the defence of each other and the king where most vulnerable; and the rut'ha or war chariots are certainly more analogous to an active state of warfare than rooks or castles.

Persian or Hindustanee chess.—The Persian game and table are both called Shatrang, or more commonly Shutrunj.

Sha, padsha or. The king has the same moves and powers as in the English game, but cannot castle, nor is stale mate admitted.

Firz, or more commonly vizier, is the general. It is the first piece moved on opening the game,

advancing one step direct in front, his piadah moving one step at the same time; this is said to be done by command of the king, that he may review and regulate the motions of the army; afterwards he can only move diagonally, in advance or retrograde, one check or step at a move, the same as the Burmha chekoy.

Fil in Persic, hust in Hindustanee, are two elephants. They move diagonally in advance or retrograde, always two steps at a move, and have, what Mr. Irwin calls, the motion of a rocket boy hopping over the head of any piece in their way, except the king, and taking any piece which stands on the second check from them in their range.

Asp, Persian, or ghora, Hindustanee, are two horse or cavalry; they have the same moves and powers as the English knight.

Rookh, Persian, or rut'h, Hindustanee, are two war chariots; they have exactly the same moves and powers as the English rook or castle.

Piadahs, or peons, footmen, have the same moves and powers as the English pawn, except that they advance only one step at a time on opening the game, and that when any of them arrive at the last line of checks on their adversary's section, should their own general have been taken, they are then called Firz, and distinguished by a pawn of the adversary being placed on the same square with them.

When the king is checked by another piece, they say sheh, sheh, or kish (the latter an Arabic word); and when check-mated, they say shah-mat, which means the king is conquered or driven to the last distress; or sometimes board or burd, the prize is gained or carried, though this expression is more generally used when all the pieces are taken except the king, and the game is consequently won.

As far as record is to be admitted in evidence, the first, or Hindu game, above described, is the most ancient, and has great internal marks of antiquity, namely, the imperfections incident to rudimental science.

The weakest flank of each army is here opposed to its antagonist's force—and the piece in each army which would be of most use on the flanks, is placed in a situation where its operations are cramped; and although it appears that two armies are allied against the other two, yet the inconvenience of their battalia in a great measure remains; besides, it also appears that each separate army has to guard against the treachery of its ally, as well as against the common enemy; for it is recommended, and allowed to either of the kings, to seize on the throne of his ally, that he may obtain complete command of both armies, and prosecute conquest for himself alone. But if the battalia were as perfect as in the European game, the circumstance of using dice, to determine the moves, is fatal to the claim of pre-eminence, or of science, which attaches to the European game, and places the ancient Hindu game on a level with backgammon, in which we often see the most consummate abilites defeated by chance.

Exclusive of the definition of the game in the Amaracosha, namely, that the four angas, or members, are elephants, horses, chariots, and foot soldiers, there are contradictions in the rules given by Gotoma and others translated by Rad-ha-cant, which are irreconcilable, unless we suppose they treat of different games. The first says, that "The king, the elephant, and the horse may slay the foe, but cannot expose themselves to be slain." Hence we infer that the ship and foot soldiers alone are vulnerable. In another place the commentator says, "If a pawn can march to any square on the opposite extremity of the board, except that of the king or ship, he assumes whatever power belonged to that square, which promotion is called shat-pada, or six strides." This contradicts the former rule. And again, "But this privilege of shat-pada was not allowable in the opinion of Gotoma; when a player had three pawns on the chess board, but when only one pawn, and one ship remained, the pawn might even advance to the square of a king or ship, and assume the power of either." From the whole we may gather, that in this game there is much abstruseness with little science, which affords strong presumption of its being rudimental.

We place the Chinese game the second in the series, because there is a record of its relative antiquity; but not from conviction: for the next improvement of the ancient Hindu game appears to have been that which at present obtains amongst the Burmhas, who are Hindus of the Pali tribe, and derive all their literature and science from the common source. In the Burmhan game the first dawn of perfection appears, while the ancient Hindu names, according to the Amaracosha, are retained, the two armies are consolidated, and commanded by a general immediately under the eye of the king, the order of the battalia improved, and chance rejected.

The Persian game is but a slight variation in principle from the Burmha; the order of battle is restrained to one mode, and the foot soldiers and principals each drawn up at the extreme face of the board or field of battle, in rank entire, according to the improved system of modern warfare. Other alterations appear to me adventitious, or the effect of caprice rather than judgment.

The modern European game appears to be an improvement on the Persian, and only requires that the original names should be restored to the pieces to give it full claim to pre-eminence.

We repeat it, we are at some loss to know where the Chinese game ought to be placed; but its claims to precedence are of little importance. The account of its invention, for which we are indebted to Mr. Eyles Irwin, is as follows.

"Three hundred and seventy years after the time of Confucius, or 1965 years ago (174 years before Christ), Hung Cochee, king of the Kiangnan, sent an expedition into the Shensi country, under the command of a mandarin, called Hemsing, to conquer it. After one successful campaign, the soldiers were put into winter quarters, where finding the weather much colder than what they had been accustomed to, and being also deprived of their wives and families, the army in general became impatient of their situation, and clamorous to return home. Hemsing, upon this, revolved in his mind the bad consequences of complying with their wishes; and the necessity of soothing his troops and reconciling them to their position appeared urgent, in order to finish his operations the ensuing year. He was a man of genius as well as a good soldier, and having contemplated some time on the subject, he invented the game of chess, as well for an amusement to his men in their vacant hours, as to inflame their military ardour, the game being wholly founded on the principles of war. The stratagem succeeded to his wish; the soldiery were delighted with the game, and forgot in their daily contests for victory the inconvenience of their post. In the spring the general took the field again, and in a few months added the rich country of Shensi to the kingdom of Kiangnan, by the defeat and capture of Choupayen, a famous warrior among the Chinese. On this conquest Hung Cochee as-

sumed the title of emperor, and Choupayen put an end to his own life in despair."

We have met with a similar tale among the Persian writers, but such tales are easily fabricated, and from the complaisance of national vanity as easily credited.

That Hansing introduced this game with modifications suited to the genius and manners of the Chinese for the purposes ascribed above, we can readily believe; but the introduction of artillery or rocket boys, the general perfection of the game, similitude to the Hindu game, and date of the supposed invention, are strong evidences against its originality.

We are aware that there are many other games of chess played in Asia; but we consider them merely as anomalies, unimportant or unworthy of note; the four we have adduced are the principal, to which all the others may be referred.

The honourable Mr. Daines Barrington has taken considerable pains on the subject of the various etymologies of the terms *pieces*, &c; and the reason he assigns for the uncouth form of the pieces as made in Europe is very just, viz. that we received the game from the Arabs, who, as Mahomedans, being prohibited the use of paintings or engraved images, merely gave to their chess pieces such distinct forms as enabled them to readily recognize them in play; and such arbitrary variation being once introduced, others naturally followed, according to the caprice or taste of each new innovator.

But he differs from doctor Hyde and sir William Jones in respect to our exchequer being named from the chess-table; proving that the term was not directly so derived: yet this is not proving it was not derived indirectly; for although the game of chess might not have been known to the nations of modern Europe so early as the Norman conquest, yet it appears from the check or reckoning board found at Pompeii, and from the Latin name *scaccario*, that the use of the table was very early known in Europe; and therefore sir William Jones may still be right in deriving exchequer from chaturanga. One remarkable coincidence in the Asiatic tables may be noticed; they are all subdivided into sixty-four squares, but not checkered.

The piece we call the king is also so styled in all the games we are acquainted with, except the Chinese, who call it the choohong, or scientific in war.

The piece we call the queen, the honourable Mr. Barrington derives from the Persian, pherz, or general; and exposes the absurdity of calling this piece a queen, by asking how we are to metamorphose a foot soldier or pawn into a queen, as admitted in the English game, &c. Sir William Jones more correctly writes it ferz, and adds "hence the French have derived *vierge*, &c."—If so, the blunder arises from French gallantry. *Vierge* in French is *virgo*, and consorted with the king, they, by a very natural transition, made their virgin a queen. But whence the Persian title of ferz? Mr. Richardson merely informs us that ferz, ferzeen, ferzan, and ferzee, mean the queen at chess. The common term for this piece in the Persian language is vizeer, or vuzeer, a minister, but in their emphatic way of writing and speaking, they have in this case made a noun substantive of a distinctive adjective, to denote the eminence of the piece, as we shall have further occasion to notice. Ferz, or ferzan, therefore, neither means queen nor general in a literal sense; but eminent, distinguished, &c. Ferzee further means science, learning, wisdom, &c.

The piece we call a castle or rook, Mr. Barrington says is derived from the Italian *il rocco*—but what is *il rocco* (the castle) derived from? Sir William Jones says, "It were in vain to seek an etymology of the word rookh in the modern Persian language, for in all the passages extracted from Ferdausi and Jami where rokh is conceived to mean a hero, or a fabulous bird, it signifies perhaps no more than a cheek or face."—All our enquiries teach us that in this instance also a name has been formed from a quality; and that in modern Persian rookh means facing or bearing in a direct line; and applied to the rookh at chess, and its moves, is very appropriate; at the same time we have no doubt that the Persian was originally derived with the game from the Hindus, who call the piece rot'h and rut'ha; and denominate the ship or boat, which is substituted for the castle, either naucá or róca. The corruption is as easy as the French vierge from pherz or ferz, and the only difference is that Persian pride has endeavoured to legitimise the blunder by assigning a reason for it.

The pieces we call bishops, Mr. Barrington says are called by the French fou or fools, and supposes the epithet to have been bestowed on them by some wag, because kings and queens were anciently attended by fools.

We are ready to admit that war is but too often the offspring of vice and folly, and that it is no great proof of wisdom in bishops to forsake their habits of peace for war, but think it is refining a little too much to stigmatise them in particular as fools on that account.—Sir William Jones adduces a more legitimate derivation, in supposing the fol or fou of the French (for it is pronounced both ways occasionally) to be derived from the Persian fil or feel, an elephant. In Italian these pieces are still denominated *il alfino* or the elephant, and so they were in England at the beginning of the seventeenth century.—Perhaps the French fou may have been derived from the Chinese fou, the grave councillors who attend on the choohong or general, and who have the same diagonal moves as the bishops; and their mandarin caps may have been changed with their names for mitres, as we now see them engraved.

The pieces we call knights or horses have in general the same appellation in other languages.

The pawns, it is easy to perceive, are derived from paon (a foot) Hindustanee, piadah Persian, and padati Sanscrit.

Doctor Hyde observes, "That the word chess is derived from the Persian word shah or king, which word is often used in playing, to caution the king against danger. Hence Europeans and others have denominated the game shachiludium and shailudium; and the English chess."

The term *mate* used at the termination of the game is from the Persian shah-mat, the king is conquered or driven to the last distress.

The Persians also have a term peculiar to themselves, to denote the advancement of a pawn or piada. When it arrives at the last line of checks in the adversary's divison, they say it is ferzeen or distinguished, and in case the vizeer or ferz has been lost, it assumes its rank, and is distinguished by one of the adversary's pawns being placed on the same square with it.

For the purpose of comparing the European with the Asiatic game, we here annex a comparative table of the names and terms used at the game of chess in four principal Asiatic, and four principal European, languages.

COMPARATIVE TABLE of Terms used at the Game of Chess, in four principal Asiatic and four principal European Languages.

English.	French.	Italian.	German.	Sanscrit.	Persian.	Chinese.	Burmha.
Chess,	E'checs,	Scacchi,	Scachkspiel	Chaturanga chaturaji,	Shutrang, shatranj,	Choke choo-hongki,	Chit-tharein.
King,	Roi,	Ré,	Koenig,	Raja,	Sháh, pád-sháh,	Choohong, (ge-neralissimo,)	Meng.
Queen,	Dame,	Regina dame,'	Koenigin, dame,	Mantrí (prime minister,)	Vizír Ferz Ferzí (mi-nister,)	Sou, (counsel-lor,)	Chekoy. (general.)
Bishop,	Fou,	Alfino,	Springer,	Hastí, Pílu, (elephant)	Fíl Píl (ele-phant,)	Tchong, (ele-phant)	Chein, (ele-phant.)
Knight,	Cavalier,	Cavaliere, cavallo,	Ritter,	Aswa, (horse)	Asp, Feres (horse)	Mái, (horse,)	Mhee, (caval-ry.)
Castle or rook,	Tour, roi,	Rocco,	Elephant, roche,	Rat'ha, (a car) Nau-ca, or roca (a ship or boat,)	Rukh,	Tche (war chariot)	Rut ha, (war chariot.)
Pawn,	Pion,	Pedina, pedona,	Baur,	Padáti, pa-dica, (foot soldier)	Peadah, bidek,	Paoo, (artil-lery)	Yein, (foot soldiers.)
Check,	E'chec au roi,	Scaccoral ré.	Schach,		Sheh, kish, kisht,	Ping, foot sol-diers,	Kwai.
Checkmate, or maté.	E'chec et mat, mat.	Scacco matto,	Schach matt,		Mát, sheh mát,		Shoombe.

N. B. The Sanscrit and Persian terms in this table are expressed according to sir W. Jones's system of orthography. As. Res. Vol. I.

Modern European game.—The board, as we have already observed, is divided into sixty-four rectangular squares, chequered alternately black and white. The pieces played with are thirty-two in number, of different forms, denominations, and powers, divided into two colours or parties. The king and his officers, being eight pieces on each side, are ranged at opposite ends upon the first lines of the board.

The white king must be upon the fourth a black square, at one end of the board, reckoning from the right: the black or red king upon the fifth, a white square, at the other end of the board; opposite to each other. The white queen must be upon the fifth, a white square, on the left of her king. The black queen upon the fourth, a black square, on the right of her king. The bishops must be placed on each side of their king and queen. The knights on each side of the bishops. The rooks, in the two corners of the board, next to the knights; and the eight pawns, or common men, upon the eight squares of the second line.

The pieces and pawns on the side of each king take their names from him, as those on the side of the queen do from her, and are called the black or white king's bishop; the king's knights; the king's rooks; the king's pawns; the king's bishop's pawns; the king's knight's pawns; and king's rooks pawns; the black or white queen's bishops; the queen's knights; the queen's rooks; the queen's pawns; the queen's bishop's pawns; the queen's knight's pawns; and the queen's rook's pawns. The squares are named from the pieces, viz. where the king stands, is called the square of the king: where his pawn stands, is called the second square of the king: that before the pawn is called the third square of the king; that beyond it is called the fourth square of the king; and so of all the rest.

The king (the oriental *chah*) moves every way, but only one square at a time (except in the case of castling), and must always be at least one square distant from the antagonist king. The king may leap once in the game, either on his own side, or on the side of his queen (viz. the rook is moved into the next square to the king; and the king moves to the square on the other side of him, which is also called castling); provided nevertheless no piece is between him and the rook; nor after this rook hath been played; nor after the king hath been moved; nor when the king is in check; nor when the square over which he means to leap is viewed by an adverse man, who would check him in his passage.

The queen (originally pherz, general) possesses the moves and powers of the rook, and bishop, in a straight line, and also angularly.

The bishops (formerly fil, an elephant) move

only angularly, backward or forward, in the same colour as each are at first placed, but can take at any distance when the road is open.

The knights (horse soldiers) move obliquely, backward or forward, upon every third square, including that which they stood on, from black to white, and from white to black, over the heads of the men, which no other is allowed to do.

The rooks (at first rat'h, an armed chariot, or rokh, an hero) move in a right line, either forwards, backwards, or sideway, through the whole file, can stop at any square, and take at any distance when no other piece intervenes.

A pawn (peon, an attendant) moves one square at a time, in a straight line forward, and takes the enemy angularly. He may be moved two squares the first move, but never backwards, and is prohibited from quitting his own file, except in case of making a capture, when he is moved into the place of the captive, and afterwards advances forward in that file.

If the square over which any pawn leaps is viewed by an adversary, that man may take the pawn, and then must be placed in the square over which the pawn hath leaped. A pawn getting to the head of the board upon the first line of the enemy (styled going to queen) may be changed for any one of the pieces lost in the course of the game, and the piece chosen must be placed on the square at which the pawn had arrived.

The men can take the adversaries who stand in their way, provided the road lies open; or they may decline it, and must be set down in the same squares from which the contrary men are taken.

When the adversary's king is in a situation to be taken by you, you must say check to him; by which you warn him to defend himself, either by changing his place, or by covering himself with one of his own men, or by taking the man who assaults him: if he can do none of these things, he is check-mated (shehma, the king is dead) and loses the game. The king cannot change his square, if he by so doing goes into check; and when he has no man to play, and is not in check, yet is so blocked up, that he cannot move without going into check, this position is called a stale-mate, and in this case the king, who is stale-mated, wins the game in England, but in France this situation makes a drawn game.

Many chess players give notice when the queen is in danger of being taken, by saying, check to the queen.

Several variations have at different periods been introduced into chess. In some of the eastern games the power of the pherz or minister (the piece we call queen) was very limited, being allowed only to move from square to square, and never to be further than two from the king. Tamerlane the Great did not think it beneath him to invent new pieces, which rendered the game more complicated, and after his death were disused. Carrera added two, the campione, and the centaur: with two other pawns, and increased the squares to eighty. Arch-chess was played on a board with one hundred squares, besides two new pieces, stiled the centurion and decurion, and two pawns additional on each side. The duke of Rutland's game consisted of one hundred and forty squares, with fourteen pieces and fourteen pawns on each side, one of which was named the concubine, and another the crowned rook. The round-game was played on a round board, divided into sixty-four parts of four circles. The German military game, on one hundred and twenty-one squares, had on each side a king, two guards, two cuirassiers, two dragoons, two huzzars, five cannon, and eleven fusiliers. The king and pawn's game was merely a curious variation from the common method; where the king and pawns on one side were opposed to the king, pieces, and pawns on the other, in which the player, with the king and pawns only, was almost certain of winning.

The Germans sometimes play a double game with two boards by four people, two of a side, each not only playing his own game but also assisting his partner. The Russians, in addition to other moves, give that of the knight to the queen; they likewise play four persons at a time, two against two, on a board larger than usual, containing more squares, and a greater number of men. Demoivre shews a method of covering with the knight all the squares of the board in sixty-four moves.

Some whimsical people in England have lately endeavoured to alter the names of the chess men, by changing that of queen into minister, rook to peer, and pawn to commoner; and instead of castling they say closetting. The board by these innovators is technically called the exchequer, the squares are styled houses, the ranges of which in a straight line, from right to left, are denominated ranks, and perpendicularly from one player to the other are files.

Relative value of the pieces and pawns.

King	$6\frac{1}{2}$	Knight	$2\frac{1}{4}$
Queen	$23\frac{3}{4}$	Rook	15
Bishop	$9\frac{3}{4}$	Pawn	2

The power of the king for attack or defence is as above stated, though from the principle of the game he is invaluable; the power of the pawn is as 2, but from its chance of promotion the real value is calculated at $3\frac{3}{4}$.

Difficult check-mates are a knight and bishop, or two bishops against a king; a rook and bishop against a rook, and a queen against a bishop and knight.

Directions to be attended to in playing.—1. Move your pawns before your pieces, and afterwards bring out the pieces to support them; therefore the king's, queen's, and bishop's pawns should be the first played, in order to open the game well.

2. Do not play out any of your pieces early in the game, because you thereby lose moves, in case your adversary can, by playing a pawn, make them retire, and also opens his game at the same time; especially avoid playing your queen out, till your game is tolerably well opened.

3. Avoid giving useless checks, and never give any unless to gain some advantage, because you may lose the move if the adversary can either take or drive your piece away.

4. Never crowd your game by having too many pieces together, so as to prevent advancing or retreating your men as occasion may require.

5. If your game happens to be crowded, endeavour to free it by exchanges of pieces or pawns, and castle your king as soon as convenient; afterwards bring out your pieces, and attack the adversary where weakest.

6. When the adversary plays out his pieces before his pawns, attack them as soon as you can with your pawns, by which you may crowd his game, and make him lose moves.

7. Never attack the adversary's king without a sufficient force; and if he attacks yours, and you

cannot retaliate, offer exchanges; and should he retire, when you present a piece to exchange, he may lose a move. It also may sometimes be expedient to act in this manner in case of other attacks.

8. Play your men in guard of one another, so that if any be taken, the enemy may also be captured by that which guarded yours, and endeavour to have as many guards to your piece as your adversary advances others upon it; and, if possible, let them be of less value than those he assails with. When you cannot well support your piece, see if by attacking one of his that is better, or as good, you may not thereby save yours.

9. Never attack but when well prepared, for thereby you open your adversary's game, and prepare him to pour in a strong attack upon you, as soon as your weak one is over.

10. Never play till you have examined whether you are free from danger by your adversary's last move; nor offer to attack till you have considered what harm he would be able to do you by his next moves, in consequence of yours.

11. When your attack is in a prosperous way, never be diverted from it by taking any piece, or other seeming advantage, your adversary may purposely throw in your way, with the intent that by your taking the bait he might gain a move which would make your design miscarry.

12. When in pursuing a well-laid attack, you find it necessary to force your adversary's defence, with the loss of some pieces; if, upon counting as many moves forward as you can, you find a prospect of success, sacrifice a piece or two to gain your end: these bold attempts make the finest games.

13. Never let your queen stand so before the king, as that your adversary, by bringing forwards a rook or a bishop, might check your king if she was not there, for you could hardly save her, or perhaps at best must sacrifice her for an inferior piece.

14. Let not your adversary's knight fork your king and queen, or king and rook, or queen and rook, or your two rooks, at the same time; for in the two first cases, the king being forced to go out of check, the queen or the rook must be lost; and in the two last a rook must be lost, at best, for a worse piece.

15. Take care that no guarded pawn of your adversary fork two of your pieces: knights and rooks are particularly liable to this mode of attack; also guard against either a check by discovery, or a stale-mate.

16. When the kings have castled on different sides of the board, attack with the pawns you have on that side where the adversary has castled, advancing the pieces, especially the queen and rooks, to support them; and if the adversary's king has three pawns on a line in front, he should not stir them till forced to it.

17. Endeavour to have a move in ambuscade; that is, place the queen, bishop, or rook behind a pawn, or a piece, in such a manner, as upon playing that pawn, or piece, you discover a check upon your adversary's king, and consequently may often get a piece, or some other advantage by it.

18. Never guard an inferior piece or pawn with a better, if you can do it with a pawn, because that better piece may in such a case be, as it were, out of play.

19. A pawn pushed on, and well supported, often costs the adversary a piece; but one separated from the others is seldom of any value. And whenever you have gained a pawn, or other advantage, and are not in danger of losing the move thereby, make as frequent exchanges as you can.

20. If each player has three pawns upon the board, and no piece, and you have a pawn on one side of the board, and the other two on the other side, and your adversary's 3 are opposite to your 2, march with your king to take his pawns; and if he moves to support them, go on to queen with your single pawn; and if he attempts to hinder it, take his pawns, and push yours to queen; that is to move a pawn into the adversary's back row, in order to make a queen, when the original is lost.

21. At the latter end of a game, each party having only three or four pawns on different sides of the board, the kings are to endeavour to gain the move, in order to win the game.

22. When the adversary has no more than his king and one pawn on the board, and you a king only, you can never lose that game if you bring and keep your king opposite to your adversary's, when he is immediately either before or on one side of his pawn, and only one house between the kings. This must then either be a drawn game, or if the opponent persists in his endeavours to win, he will lose by a stale-mate, by drawing you upon the last square.

23. When your adversary has one pawn on the rook's line, with a king and bishop against a king only, and his bishop is not of the colour that commands the corner-house his pawn is going to, if you can get your king into that corner, you cannot lose that game, but may win by a stale-mate.

24. When you have only your queen left in play, and your king happens to be in the position of stale-mate, keep giving check to your adversary's king, always taking care not to check him where he can interpose any of his pieces that make the stale: so doing, you will at last force him to take your queen, and then you win the game by being in stale mate.

25. Never cover a check with a piece that a pawn pushed upon it may take, for fear of only getting that pawn for it.

26. Do not crowd your adversary's king with your pieces, lest you inadvertently give a stale-mate.

27. Do not be too much afraid of losing a rook for an inferior piece; although a rook is better than any other, except the queen, yet it seldom comes into play, so as to operate, until the end of the game; and it is generally better to have a worse piece in play than a superior out.

28. When you have moved a piece, which your adversary drives away with a pawn, that is a bad move, your enemy gaining a double advantage. At this nice game no move can be indifferent. Though the first move may not be much, between equally good players, yet the loss of one or two more, after the first, makes the game almost irretrievable: but if you can recover the move, or the attack (for they both go together) you are in a fair way of winning.

29. If ever your game is such that you have scarce any thing to play, you have either brought out your pieces wrong, or, which is worse, not at all; for if you have brought them out right, you must have variety enough.

30. Do not be afraid of doubling a pawn: two in a direct line are not disadvantageous when surrounded by three or four others. Three together are strong, but four that make a square, with the

help of other pieces, well managed, form an invincible strength, and probably may produce you a queen: on the contrary, two pawns, with an interval between are no better than one; and if you should have three over each other in a line your game cannot be in a worse situation.

31. When a piece is so attacked that it is difficult to save it, give it up, and endeavour to annoy your enemy in another place; for it often happens, that whilst your adversary is pursuing a piece, you either get a pawn or two, or such a situation as ends in his destruction.

32. Supposing your queen and another piece are attacked at the same time, and by removing your queen, you must lose the piece, if you can get two pieces in exchange for her, rather do that than retire; for the difference is more than the worth of a queen; besides you preserve your situation, which often is better than a piece; when the attack and defence are thoroughly formed, if he who plays first is obliged to retire by the person who defends, that generally ends in the loss of the game on the side of him who attacks.

33. Do not aim at exchanges without reason; a good player will take advantage of it, to spoil your situation, and mend his own: but when you are strongest, especially by a piece, and have not an immediate check-mate in view, then every time you exchange, your advantage increases. Again, when you have played a piece, and your adversary opposes one to you, exchange directly, for he wants to remove you: prevent him, and do not lose the move.

34. Every now and then examine your game, and then take your measures accordingly.

35. At the latter end of the game, especially when both queens are off the board, the kings are capital pieces, do not let yours be idle; it is by his means, generally, you must get the move and the victory.

36. As the queen, rooks, and bishops operate at a distance, it is not always necessary in your attack to have them near your adversary's king; they do better at a distance, cannot be driven away, and prevent a stale-mate.

37. When there is a piece you can take, and that cannot escape, do not hurry; see where you can make a good move elsewhere, and take the piece at leisure.

38. It is not always right to take your adversary's pawn with your king, for very often it happens to be a safeguard and protection to him.

39. When you can take a man with different pieces, consider thoroughly with which you had best take it.

General maxims.—Whether you play the open or close game, bring out all your pieces into play before you begin the attack; for if you do not, and yonr adversary does, you will always attack, or be attacked, at a great disadvantage; this is so essential, that you had better forego an advantage than deviate from it; and no person can ever play well who does not strictly practise this. In order to bring out your pieces properly, push on your pawns first, and support them with your pieces, thereby your game will not be crowded, and all your pieces will be at liberty to play and assist each other, and so co-operate towards obtaining your end: and either in your attack or defence, bring them out so as not to be driven back again.

2. When you have brought out all your pieces, which you will have done well, if you have your choice on which side to castle; then consider thoroughly your own and adversary's game, and not only resolve where to castle, but likewise to attack where you appear strongest, and your enemy weakest. By this it is probable you will be able to break through your adversary's game, in which some pieces must be exchanged. Now pause again and survey both games attentively, and do not let your impetuosity hurry you on too far; at this critical juncture (especially if you still find your adversary pretty strong) rally your men, and put them in good order for a second or third attack, still keeping your men close and connected, so as to be of use to each other. For want of this method, and a little coolness, an almost sure victory is often snatched out of a player's hands, and a total overthrow ensues.

3. At the last period of the game, observe where your pawns are strongest, best connected, and nearest to queen, likewise mind how your adversary's pawns are disposed, and compare these things together; and if you can get to queen before him, proceed without hesitation; if not, hurry on with your king to prevent him: I speak now, as supposing all the noblemen are gone; if not, they are to attend your pawns, and likewise to prevent your adversary from going to queen.

4. A single pawn cannot win if the adversary's king is opposed to it; but its own king is placed before it, then the pawn may win.

5. Two pawns against one must win in most cases; but the player, possessing the two, should avoid exchanging one of them for his adversary's pawn.

6. A pawn, with any piece, must win in every case, except with a bishop, when the pawn is on a rook's file, and the bishop does not command the square where the pawn must go to queen.

7. Two knights, without any other man, cannot give check-mate.

8. Two bishops may win.

9. A knight, with a bishop, may win.

10. A rook against either a knight or a bishop makes a drawn game; as also does a rook and a knight against a rook.

11. A rook with a bishop against a rook may win.

12. A rook with either a bishop or a knight against a queen make a drawn game.

13. A queen against a bishop and a knight may win.

14. A queen against a rook with two pawns makes a drawn game.

15. A rook against either a bishop or a knight with two pawns makes a drawn game.

In order to determine what shall be a drawn game, it is customary towards the conclusion to fix 50 more moves on each side as the number to ascertain that point.

Laws of Chess.—1. If you touch your man you must play it, except that would expose your king to check, in which case you are only, when possible, to move the king; and so long as you keep hold, you may place the said man where you please; but once having quitted, you then cannot recal the move; though should any men be displaced by accident those are to be restored.

2. If you touch one of your adversary's men, he may insist upon your taking it; and when you cannot do so, then you are to move your king, provided that may be effected without putting him on check.

3. If by mistake, or otherwise, you make a

false move, the opponent can oblige you to move the king (as in the 2d article); but if he plays without noticing the said false move, neither of you can afterwards recal it.

4. If you misplace your men, and play two moves, it lieth in your adversary's power whether he will permit you to begin the game afresh.

5. When the adversary gives check without warning, you are not obliged to notice it until he does; but if on his next move he warns you, each party must then retract his last move, and the king be removed off check.

6. Should the opponent warn you of a check without really giving it, and you have even moved your king, or any other man, you are in such case allowed to retract before the opponent has completed his next move.

7. You are not to give check to your adversary's king by any piece, which by so moving would discover check on your own king.

8. After your king or the rook has moved, you cannot castle; and if you attempt it, the adversary may insist that you move either the king or rook.

9. In each fresh game, the players have the first move alternately; but where the advantage of a piece or pawn is given, the player given that advantage is entitled to the first move.

Che'ss-board. *s.* The board or table on which the game of chess is played (*Prior*).

Che'ss-man. *s.* A puppet for chess (*Locke*).

CHEST. *s.* (cẏꞅꞇ, Saxon, *cista*, Latin.) 1. A box in which things are laid up (*Shak.*). 2. A chest *of drawers.* A case with moveable boxes or drawers. 3. The trunk of the body, or cavity from the shoulders to the belly, that part which contains the heart and lungs. See Breast and Thorax.

Chest, in oryctology. See Petrosilex.

Chest at Chatham was established in 1588, for the benefit of maimed and superannuated English mariners, out of which pensions are paid to such for their lives. This fund was at first raised by a voluntary monthly contribution of the mariners out of their pay, and afterwards made perpetual by queen Elizabeth.

By 43 Geo. III. c. 119. this institution was removed from Chatham to Greenwich, and denominated "The chest at Greenwich," being committed to the management of a body corporate.

Chest-founder. In veterinary science, a peculiar debility in the shoulders, chest, and fore-quarters of a horse. It is generally a chronic disease subsequent to violent exertion, and acute inflammation produced from such cause; the horse in this case is totally incapable of moving either far or fast, and cannot be made to move at all without great difficulty. Every limb labours, but chiefly the shoulders and fore-quarters: in this case the trot becomes a jerk and the gallop a jump. The cure is difficult: the best means of attempting it are rest and very gentle and progressive exercise, the reverse of what he has been accustomed to.

CHE'STED. *a.* Having a chest.

CHESTER, or West-Chester, the capital of Cheshire, with markets on Wednesdays and Saturdays. It is a place of great antiquity, and plainly appears to have been a Roman station. Its walls are nearly two miles about, and have four gates. The four principal streets are as if excavated out of the earth and sunk many feet beneath the surface. The town contains 3,196 houses, and 15,052 inhabitants, who are governed by a mayor, two sheriffs, and 24 aldermen, and sends two members to parliament. It is a place of considerable trade, and has two celebrated fairs annually. It has a strong castle and 10 churches, besides the cathedral. The bishopric of Chester was erected in 1541, and is valued in the king's books, at 420*l.* 1*s.* 8*d.* Lat. 53. 12 N. Lon. 3. 3 W.

Chester, a county of Pennsylvania, 44 miles long, and 22 broad. In 1790 it contained 27,937 inhabitants. Its capital is West-Chester, in Lat. 39. 54 N. Lon. 75. 3 W.

Chester-le-Street (the Cuneacestre of the Saxons), a small thoroughfare town between Newcastle and Durham, with a good church and fine spire. This church is collegiate, and was formerly the see of a bishop, until removed with the body of St. Cuthbert (in 995) to Durham.

CHESTERFIELD, a town of Derbyshire, with a market on Saturdays. It is governed by a mayor, and next to Derby is the most considerable trading town in the county; containing about 4,270 inhabitants. Here are stocking manufactures, potteries, iron works, &c. Lat. 53. 18 N. Lon. 1. 27 W.

CHESNUT, in botany. See Fagus.

Chesnut (Horse). See Æsculus.

Chesnut (Indian Rose). See Mesua.

Chesnut, a colour like that of the kernel of the fruit.

CHEVAL DE FRISE, a large piece of timber pierced, and traversed with wooden spikes, armed or pointed with iron, five or six feet long. The term is French, and properly signifies a Friesland horse; as having been first invented in that country. It is also called a turnpike or turniquet. Its use is to defend a passage, stop a breach, or make a retrenchment to stop the cavalry. It is sometimes also mounted on wheels, with artificial fires, to roll down in an assault. Errard observes, that the prince of Orange used to enclose his camp with chevaux de frise, placing them over one another.

CHEVALER, in the manage, is said of a horse, when, in passing upon a walk or trot, his off fore-leg crosses or over-laps the near fore-leg every second motion.

CHEVALIER, a French term, ordinarily signifying a knight. The word is formed of the French *cheval*, horse, and the barbarous Latin *cavallus*. It is used, in heraldry, to signify any cavalier, or horseman armed at all points; by the Romans called *cataphractus eques*: now out of use, and only to be seen in coat-armour.

CHEVAUX DE FRISE. See Cheval de frise.

CHEVIOT, or Tiviot hills, a ridge of

mountains which run from N. to S. through Cumberland and Northumberland, remarkable for obstinate battles between the English and Scots.

CHE'VEN. *s.* (*chevesne*, French.) A fish; the chub.

CHE'VRIL. *s.* (*cheverau*, French.) A kid; kid leather: obsolete (*Shakspeare*).

CHE'VISANCE. *s.* (French.) Enterprise; achievement: not in use (*Spenser*).

CHE'VRON, or CHE'VERON, in heraldry, one of the honourable ordinaries of a shield, representing two rafters of an house, joined together as they ought to stand; it was anciently the form of the priestesses' head attire: some say it is a symbol of protection; others, of constancy; others, that it represents knights' spears, &c. It contains the fifth part of the field. See HERALDRY.

To CHEW. *v. a.* (ceopyan, Saxon.) 1. To grind with the teeth; to masticate (*Arbuthnot*). 2. To meditate; to ruminate in the thoughts (*Prior*). 3. To taste without swallowing (*Bacon*).

To CHEW. *v. n.* To champ upon; to ruminate (*Pope*).

CHEWING-BALLS, among farriers, balls made of asafœtida, liver of antimony, bay-wood, juniper-wood, and pellitory of Spain, which being dried in the sun, wrapped in linen cloth, are tied to the bit of the bridle for the horse to chew. They are said to create an appetite.

CHEYNE (George), an eminent physician. He was born in Scotland in 1671, and educated at Edinburgh. At the age of 30 he came to London, and led a jovial life; in consequence of which, he became so corpulent that his life was a burden to him. He then had recourse to a vegetable diet, which removed his complaints, and reduced his weight from 32 stone to about 24: he died at Bath, aged 72. The doctor was a man of abilities, and published Philosophical Principles of Religion, natural and revealed; the English Malady, or a treatise of Nervous Diseases; Fluxionum Methodus Inversa, sive quantitatum fluentium leges Generationes, &c.

CHIABRERA (Gabriel), esteemed the Pindar of Italy, was born at Savona in 1552, and studied at Rome. The Italian princes, and Urban VIII., gave him public marks of their esteem. He wrote many poems, but his lyric verses are most admired. He died at Savona in 1638, aged 86.

CHIAN PEPPER. See PIPER INDICUM.

CHIAN TURPENTINE. See CHIO-TURPENTINE.

CHIAPA, a province of Mexico, in North America, abounding in cochineal, cattle, fruits, and honey. It brings in a good revenue to Spain.

CHIAPA, an episcopal town of Mexico, in North America, the capital of Chiapa. Lat. 17. 10 N. Lon. 94. 45 W.

CHIARENZA, one of the four districts of the Morea, in European Turkey. Its principal town, which is a seaport, is of the same name. Lat. 37. 50 N. Lon. 21. 35 E.

CHIARI, a town of Brescia, in Italy, belonging to the Venetians. Lat. 45. 30 N. Lon. 10. 17 E.

CHIAROSCURO, effect produced in painting or drawing, by an artful conduct and union of colours and light and shade. See PAINTING.

CHIAVENNA, a large town of the Grisons, in Switzerland. The inhabitants, who are Roman Catholics, trade principally in wine and delicate fruits. Lat. 46. 19 N. Lon. 9. 19 E.

CHIAUSI, among the Turks, officers employed in executing the vizirs, bashaws, and other great men. The orders for doing this, the grand signior sends wrapped up in a black cloth; on the reception of which they perform their office.

CHIBOU GUM. A spurious kind of elemi.

CHICA'NE. *s.* (*chicane*, French.) 1. The art of protracting a contest by petty objection and artifice (*Locke*). 2. Artifice in general (*Prior*).

To CHICA'NE. *v. n.* (*chicaner*, French.) To prolong a contest by tricks.

CHICA'NER. *s.* (*chicaneur*, French.) A petty sophister; a wrangler (*Locke*).

CHICA'NERY. *s.* (*chicanerie*, French.) Sophistry; mean arts of wrangle (*Arbuthnot*).

CHICHESTER, the capital of Sussex, having markets on Wednesdays and Saturdays. It sends two members to parliament, and is governed by a mayor, recorder, deputy-recorder, 14 aldermen, six bailiffs, 27 commoners, and a portreve. From the market-place, the four gates of the city, which is walled round, may be seen. It is the see of a bishop; the bishopric being first erected at Selsey, about 681, was afterwards removed to Chichester, about 1070; it was valued in the king's books, temp. Henry VIII. at 677*l.* 1*s.* 3*d.* per annum. The bishop retains his own tenths, as also those of several other dignities and benefices within his diocese. This city contains 831 houses, and 4,744 inhabitants. Lat. 50. 50 N. Lon. 0. 48 W.

CHICK. CHI'CKEN. *s.* (cicen, Saxon; *kiecken*, Dutch. Chicken is the old plural of chick, though now used as a singular noun.) 1. The young of a bird, particularly of a hen, or small bird (*Davies. Swift.*) 2. A word of tenderness (*Shakspeare*). 3. A term for a young girl (*Swift*).

CHICKEN-POX. See VARICELLA.

CHI'CKEN-HEARTED. *a.* Cowardly; timorous; fearful (*Spenser*).

CHICK-PEA. In botany. See CICER.

CHICKES. In botany. See CICER.

CHICKLING VETCH. In botany. See LATHYRUS.

CHICKWEED. In botany. See ALCINE.

CHICKWEED (African). See MOLLUGO.

CHICKWEED (Berry-bearing). See CUCUBALUS.

CHICKWEED (Great). See STELLARIA.

CHICKWEED (Mountain). See MOEHRINGIA.

CHICKWEED (Mouse-ear). See CERASTIUM.

CHICKWEED (Small-water). See MONTIA.

To CHIDE. *v. a.* preter. *chid* or *chode*; part. *chid* or *chidden* (cıdan, Saxon). 1. To reprove; to check (*Waller*). 2. To drive with reproof (*Shakspeare*). 3. To blame; to reproach (*Prior*).

To CHIDE. *v. n.* 1. To clamour; to scold (*Swift*). 2. To quarrel with (*Shakspeare*). 3. To make a noise (*Shakspeare*).

CHI'DER. *s.* A rebuker; a reprover (*Shakspeare*).

CHIDLEIGH, or CHUDLEIGH, a town of Devonshire, with a market on Saturdays. Lat. 50. 35 N. Lon. 3. 38 W.

CHIEF. *a.* (*chef*, the head, French.) 1. Principal; most eminent (*Pope*). 2. Eminent; extraordinary (*Proverbs*). 3. Capital; of the first order (*Locke*).

CHIEF, a term signifying the head or principal part of a thing or person. Thus we say, the chief of a party, the chief of a family, &c. The word is formed of the French *chef*, head; of the Greek κεφαλη, *caput*, head; though Menage derives it from the Italian *capo*, formed of the Latin *caput*.

CHIEF, in heraldry, is that which takes up all the upper part of the escutcheon from side to side, and represents a man's head. *In chief*, imports something borne in the chief part or top of the escutcheon.

CHI'EFLESS. *a.* Wanting a head; being without a leader (*Pope*).

CHI'EFLY. *ad.* Principally; eminently; more than common (*Dryden*).

CHI'EFRIE. *s.* (from *chief*.) A small rent paid to the lord paramount (*Spenser*).

CHI'EFTAIN. *s.* (from *chief*.) 1. A leader; a commander (*Spenser*). 2. The head of a clan (*Davies*).

CHIE'VANCE. *s.* Traffick, in which money is extorted; as discount: obsolete (*Bacon*).

CHIGOE. In entomology. See PULEX.

CHILBLAIN, pernio in medicine, a tumour affecting the feet and hands; accompanied with an inflammation, pain, and sometimes an ulcer or solution of continuity. Chilblain is compounded of *chill* and *blain*; q. d. a blain or sore by cold. Chilblains are occasioned by excessive cold diminishing the vital energy of the part, and stopping the motion of the blood in the capillary vessels. See the article PERNIO.

CHILD. *s. plur.* CHILDREN. (cılꝺ, Saxon.) 1. An infant, or very young person (*Wake*). 2. One in the line of filiation, opposed to the parent (*Addison*). 3. Any thing the product or effect of another. 4. *To be with* CHILD. To be pregnant.

Children, besides the honour and reverence which they owe to their parents, ought likewise to contribute to their support, when they need assistance. The Athenian laws obliged all children to provide for their father, when reduced to poverty; with an exception to spurious children, to those whose chastity had been defiled by consent of the father, and to those who had not been put into any way of gaining a livelihood. Our laws agree with those of Athens in the first particular; but in the other cases, a child is compellable by stat. 43 Eliz. c. 2. if able, to provide for a wicked and unnatural progenitor. See PARENT, &c.

To CHILD. *v. n.* (from the noun.) To bring children (*Arbuthnot*).

CHI'LDBEARING. *particip. s.* The act of bearing children (*Milton*).

CHI'LDBED. *s.* The state of a woman bringing a child, or being in labour (*Arbuthnot*).

CHI'LDBIRTH. *s.* Travail; labour (*Sid.*)

CHI'LDED. *a.* Furnished with a child (*Shakspeare*).

CHI'LDERMASS DAY. (from *child* and *mass*.) The day of the week throughout the year, answering to the day on which the feast of the Holy Innocents is solemnized (*Carew*).

CHI'LDHOOD. *s.* (from *child*.) 1. The state of infants; the time in which we are children (*Rogers*). 2. The time of life between infancy and puberty (*Arbuthnot*). 3. The properties of a child (*Dryden*).

CHI'LDISH. *a.* (from *child*.) 1. Having the qualities of a child; trifling; ignorant; simple (*Bacon*). 2. Becoming only children; puerile (*Sidney*).

CHI'LDISHLY. *ad.* In a childish trifling way; like a child (*Hayward*).

CHI'LDISHNESS. *s.* (from *childish*.) 1. Puerility; triflingness (*Locke*). 2. Harmlessness (*Shakspeare*).

CHI'LDLESS. *a.* (from *child*.) Without children; without offspring (*Milton*).

CHI'LDLIKE. *a.* (from *child* and *like*.) Becoming or beseeming a child (*Hooker*).

CHILD-WIT, a power to take a fine of a bondwoman gotten with child without the consent of her lord.

CHILDREN (Illegitimate). See BASTARDS.

With regard to the greatest number of children that have been borne by one woman, the most extraordinary fact which has yet come to our knowledge is mentioned in the History of Newcastle, published in 1797, and corroborated by Nos. 908 and 78 of the Harleian MSS. A weaver in Scotland had by one wife, a Scotch woman, sixty-two children! Forty-six sons attained the age of maturity, some of whom were living at Newcastle in 1630, when J. Delaval, esq. rode thirty miles to be satisfied of the truth of the report: of this numerous family only four daughters lived to be women.

CHILI, a country of South America, situated between the latitudes of 25 and 45 degrees south, and between the longitudes of 65 and 85 degrees west. It has Peru on the north, La Plata on the east, Patagonia on the south, and the Pacific ocean on the west. Both the air and soil on the west side are abundantly better than on the east, for when the east side of the Andes is covered with gross vapours, the heavens are bright and clear on the west

The east side also is a barren desert, but the west produces various kinds of corn, fruits, and flowers, in the greatest plenty. When writers, therefore, relate, that the cold is severe in Chili, and the rivers frozen, that is only to be understood of the tops of the mountains, where the rivers and springs are really covered with ice in the winter season, and the air very piercing. The country near the Pacific Ocean enjoys a fine temperate air, and a clear serene heaven, for most part of the year. The soil produces almost all sorts of corn, wine, and such fruits as are found under the same parallels in Europe and Asia. Their bread was made of maize or Indian corn, before the wheat of Europe was brought over. Their foreign trade consists in exporting their gold, silver, copper, corn, flesh, wine, oil, salt, hemp, flax, leather, hides, and tallow, to the northern plantations. In exchange they receive, from Lima and Panama, the merchandize of the East Indies and Europe, which are brought to the port of Callao. The natives of Chili are a brave people, and have frequently defeated the Spaniards, so that they have never been entirely subdued.

CHILIAD, an assemblage of several things ranged by thousands. The word is formed of the Greek χιλιας, *mille*, a thousand.

CHILIA'EDRON. *s.* (from χίλια.) A solid figure having 1000 faces.

CHILIAGON, in geometry, a regular plain figure of 1000 sides and angles.

CHILL. *a.* (cele, Saxon.) 1. Cold; that is cold to the touch (*Milton*). 2. Having the sensation of cold (*Rowe*). 3. Dull; not warm; not forward. 4. Depressed; dejected; discouraged. 5. Unaffectionate; cold of temper.

CHILL. *s.* Chilness; cold (*Derham.*)

To CHILL. *v. a.* (from the adjective.) 1. To make cold (*Dryden. Creech.*) 2. To depress; to deject (*Rogers*). 3. To blast with cold (*Blackmore*).

CHI'LLINESS. *s.* (from *chilly.*) A sensation of shivering cold (*Arbuthnot*).

CHILLINGWORTH (William), an eminent divine of the church of England, was born at Oxford in 1602, and bred there. He early made great proficiency in his studies, being of a very quick genius. He was an expert mathematician, as well as an able divine, and a very good poet. Study and conversation at the university turning upon controversy between the church of England and that of Rome, on account of the king's marriage with Henrietta, daughter to Henry IV. king of France, Mr. Chillingworth forsook the church of England, and embraced the Romish religion. Dr. Laud, then bishop of London, hearing of this, and being greatly concerned at it, wrote to Mr. Chillingworth, who expressing a great deal of candour and impartiality, that prelate continued to correspond with him. This set Mr. Chillingworth on a new inquiry; and at last determined him to return to his former religion. He was zealously attached to the royal party; and, in 1643, was present in king Charles I.'s army at the siege of Gloucester, where he advised and directed the making certain engines for assaulting the town. Soon after, having accompanied the lord Hopton, general of the king's forces in the west, to Arundel castle in Sussex, he was there taken prisoner by the parliamentary forces under the command of sir William Waller, who obliged the castle to surrender. But his illness increasing, he obtained leave to be conveyed to Chichester, where he was lodged at the bishop's palace; and, after a short sickness, died in 1644. He left several excellent works behind him; but is particularly noted for his admirable book "The Religion of Protestants a safe Way to Salvation," first printed in 1638.

CHI'LLY. *a.* Somewhat cold (*Philips*).

CHILMINAR, or CHEHULMINAR. See PERSEPOLIS.

CHI'LNESS. *s.* (from *chill.*) Coldness; want of warmth (*Bacon*).

CHILO, one of the seven sages of Greece, and of the ephori of Sparta the place of his birth, flourished about 556 years before Christ. He was accustomed to say that there were three things very difficult: "To keep a secret, to know how best to employ our time, and to suffer injuries without murmuring." According to Pliny, it was he who caused the short sentence, *Know thyself*, to be written in letters of gold in the temple of Delphos. It is said that he died with joy, while embracing his son, who had been crowned at the Olympic games.

CHILOE, an island lying near the coast of Chili, in South America, under the 43d degree of south latitude. It is the coast of an archipelago of 40 islands, and its principal town is Castro. It rains here almost all the year.

CHILTERN, a chain of chalky hills forming the southern part of Buckinghamshire, the northern part of the county being distinguished by the name of the Vale. The air on these heights is extremely healthful. The soil, though stony, produces good crops of wheat and barley; and in many places it is covered with thick woods, among which are great quantities of beech.—Chiltern is also applied to the hilly parts of Berkshire, and it is believed has the same meaning in some other counties. Hence the Hundreds lying in those parts are called the Chiltern Hundreds.

CHILTERN HUNDREDS (Stewards of). Of the hundreds into which many of the English counties were divided by king Alfred for their better government, the jurisdiction was originally vested in peculiar courts; but came afterwards to be devolved to the county courts, and so remains at present; except with regard to some, as the chilterns, which have been by privilege annexed to the crown. These having still their own courts, a steward of those courts is appointed by the chancellor of the exchequer, with a salary of 20*s.* and all fees, &c. belonging to the office. This is made a matter of convenience to the minister, whenever he wishes to remove a member of parliament in order to put another into his place. Such a one is made to accept the Stewardship of the Chiltern Hundreds, which vacates his seat.

CHIMÆRA. In zoology, a genus of the class pisces, order chondropterigia. Head pointed; spiracle single, quadripartite, under the neck; mouth beneath; upper lip five-parted; cutting teeth two, above and below; body lengthened; dorsal spine single; tail ending in a slender thread, and longer than the body. Two species.

1. C. monstrosa. Sea monster. Snout with porous folds beneath. Inhabits the deeps of the Atlantic and Northern seas; feeds on crabs, mollusca and testaceous animals; body long compressed each side, smooth, silvery, spotted with brown.

2. C. collorinchus. Snout beneath, with a smooth, inflected lip. Inhabits the Ethiopian, Chilese, and New Holland seas. See Nat. Hist. Pl. L.

CHIMÆRA, an ancient and strong town of Albania, in European Turkey, the capital of a territory of the same name. Lat. 40. 8 N. Lon. 20. 8 E

CHIMÆRA, in fabulous history, a celebrated monster, sprung from Echidna and Typhon, which had three heads, that of a lion, a goat, and a dragon, and continually vomited flames. The fore parts of its body were those of a lion, the middle was that of a goat, and the hinder parts were those of a dragon. It generally lived in Lycia, about the reign of Jobates, by whose orders Bellerophon, mounted on the horse Pegasus, overcame it. This fabulous tradition is explained by the recollection that there was a burning mountain in Lycia, whose top was the resort of lions, on account of its desolate wilderness; the middle, which was fruitful, was covered with goats; and at the bottom the marshy ground abounded with serpents. Bellerophon is said to have conquered the Chimæra, because he first made his habitation on that mountain. Plutarch says, that it is the captain of some pirates, who adorned their ship with the images of a lion, a goat, and a dragon.

Mr. Parkhurst supposes chimæra to be one of the heathen imitations of the cherubic emblems; and in support of his opinion he adduces the description given by Hesiod in his Theogonia. See Hebrew Lexicon, pa. 349. edit. v.

CHIMARRHIS. In botany, a genus of the class pentandria, order monogynia. Calyx with an entire margin; corol funnel-form; capsule inferior, two-celled, two-valved; the valves bifid at the tip; seed one in each cell; stigma two-parted. One species only: a Martinico tree with horizontal branches; leaves ovate, pointed at both ends, opposite, quite entire, shining; flowers in axillary and terminal cymes.

CHIMB. *s.* (*kime*, Dutch.) The end of a barrel.

CHIMBORAZO, a mountain of South America, in Peru, which reaches 3,220 toises above the level of the sea.

CHIME. *s.* (*chirme*, an old word.) 1. The consonant or harmonick sound of many correspondent instruments (*Ben Jonson*). 2. The correspondence of sound (*Dryden*). 3. The sound of bells struck with hammers (*Shak.*) 4. The correspondence of proportion or relation (*Grew*).

To CHIME. *v. n.* (from the noun.) 1. To sound in harmony (*Prior*). 2. To be musical. 3. To suit with; to agree (*Locke*). 4. To jingle; to clatter (*Smith*).

To CHIME. *v. a.* 1. To move, or strike, or cause to sound harmonically (*Dryden*). 2. To strike a bell with a hammer.

CHIME'RA. *s.* (*chimera*, Latin.) A vain and wild fancy (*Dryden*).

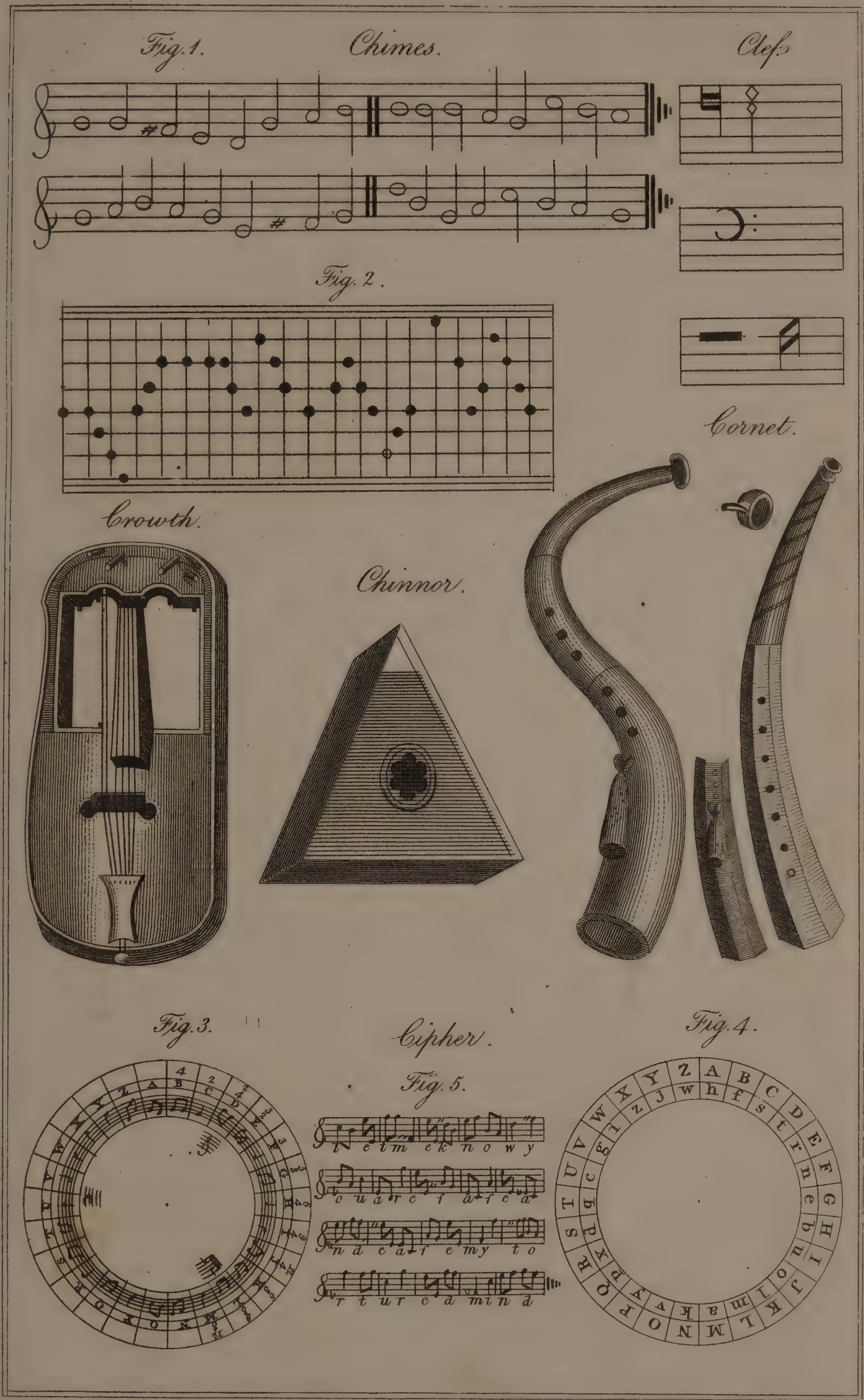
CHIME'RICAL. *a.* (from *chimera.*) Imaginary; fanciful; fantastick (*Spectator*).

CHIME'RICALLY. *ad.* Vainly; wildly.

CHIMES OF A CLOCK, a kind of periodical music, produced at certain hours of the day, by a particular apparatus added to a clock.

To calculate numbers for the chimes, and to fit and divide the chime-barrel, it must be observed, that the barrel must be as long in turning round, as you are in singing the tune it is to play. As for the chime-barrel, it may be made up of certain bars which run athwart it, with a convenient number of holes punched in them, to put in the pins that are to draw each hammer: by this means, the tune may be changed, without changing the barrel. In this case, the pins, or nuts, which draw the hammers, must hang down from the bar, some more, some less; and some must stand upright in the bar, to play the time of the tune rightly. For the placing of these pins, proceed by the way of changes on bells; viz. 1, 2, 3, 4, &c. or rather, make use of the musical notes: where it must be observed, what is the compass of the tune, or how many notes, of bells, there are from the highest to the lowest; and, accordingly, the barrel must be divided from end to end. Thus, in Pl. 40. fig. 1 and 2 represent the notes of the 100th psalm tune: as this tune is eight notes in compass, the barrel is divided into eight parts: these divisions are struck round the barrel; opposite to which are the hammer-tails.

We speak here as if there were only one hammer to each bell, that it may be more clearly apprehended; but when two notes of the same sound come together in a tune, there must be two hammers to the bell to strike it; so that if, in all the tunes you intend to chime of eight notes compass, there should happen to be such double notes on every bell; instead of eight, you must have sixteen hammers; and, accordingly, you must divide the barrel, and strike sixteen strokes round it, opposite to each hammer-tail: then divide it round about, into as many divisions as there are musical bars, semibreves, minims, &c. in the tune. Thus, the hundredth psalm tune has twenty semibreves, and each division of it is a semibreve: the first note of it, also, is a semibreve; and therefore on the chime-barrel there must be a whole division, from five to five; as you may understand plainly, if you conceive the surface of a chime-barrel to be represented by these figures; as if the cylindrical superficies of the barrel were stretched out at length, or



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extended on a plane: and then such a table, so divided, if it were to be wrapped round the barrel, would shew the places where all the pins are to stand in the barrel: for the dots running about the table, are the places of the pins that play the tune. (See fig. 2). Indeed, if the chimes are to be complete, you ought to have a set of bells to the gamut notes; so as that each bell, having the true sound of sol, la, mi, fa, you may play any tune with its flats and sharps; nay, you may, by this means, play both bass and treble with one barrel: and by setting the names of the bells at the head of any tune, that tune may easily be transferred to the chime-barrel, without any skill in music. But it must be observed, that each line in the music is three notes distant: that is, there is a note between each line, as well as upon it.

CHI'MINAGE. *s.* (from *chimin*, an old law word.) A toll for passage through a forest (*Co.*).

CHIMLEIGH, or CHUMLEIGH, a town of Devonshire, with a market on Wednesdays. Lat. 50. 55 N. Lon. 3. 30 W.

CHIMNEY, in architecture, a part of a house, or lodging, wherein the fire is made.

The word chimney comes from the French *cheminée*; and that from the Latin *caminata*, a chamber wherein is a chimney: *caminata*, again, comes from *caminus*; and that from the Greek καμινος, a chimney; of καιω, *uro*, I burn. The parts of a chimney are the jambs, or sides; the back, or hood; the mantle-tree, resting on the jambs: the tube, or funnel, which conveys away the smoke; the chimney-piece, or moulding, on the fore-side of the jambs over the mantle-tree; and the hearth, or fire-place.

Professor Beckmann having proved, to our entire satisfaction, that chimneys, such as we have now in every comfortable room, were unknown to the most polished nations of antiquity, sets himself to inquire into the era of their invention; and the oldest account of them which he finds is an inscription at Venice, which relates, that in the year 1347 a great many chimneys were thrown down by an earthquake. It would appear, however, that in some places they had been in use for a considerable time before that period; for De Gataris, in his History of Padua, relates, that Francesco de Carraro, lord of Padua, came to Rome in 1368, and finding no chimneys in the inn where he lodged, because at that time fire was kindled in a hall in the middle of the floor, he caused two chimneys like those which had long been used at Padua to be constructed by masons and carpenters, whom he had brought along with him. Over these chimneys, the first ever seen at Rome, he affixed his arms, which were still remaining in the time of De Gataris, who died of the plague in 1405.

Dr. Franklin enumerates the different causes which may occasion a smoky chimney; these are the nine following: 1. Mere want of a supply of air from without doors. 2. The openings, or fire-places, being too wide, or too high. 3. Too short a funnel. 4. Chimneys overpowering each other, or robbing each other of the means by which the draft is kept up. 5. The tops of chimneys being commanded by higher buildings or by a hill, from whence the wind beats downwards upon the aperture from whence the smoke issues. 6. The reverse of the last; viz. where the commanding eminence is farther from the wind than the chimney commanded. 7. The improper and inconvenient situation of a door. 8. The descent of smoke through a cold funnel from an adjoining chimney. 9. The passage of strong winds over the tops of the funnels, although there may be no commanding eminence near. In every case, the first step toward removing the evil, will be to ascertain the precise cause, and this will very frequently suggest the proper mode of cure. Since, therefore, the doctor has not enumerated all the causes, we will mention a few others. It frequently happens that the smoking of chimneys is occasioned by their being carried up narrower at the top than below, or in a zigzag form, or in angles; indeed, we are disposed to think, that for the most part these latter causes are most frequent as well as most difficult to cure. In the common pyramidal chimneys, when a current of air rushes downwards, the wind and smoke are in a manner confined, and as the resistance is less from below, the smoke bursts forth into the room. Venturi, when reasoning upon the lateral communication of motion in fluids, after shewing how the expenditure of tubes may be increased by enlarging the adjutages, observes, that it is not proper to make the flues of chimneys too large in the apartments; but that it will be sufficient if they be enlarged at their upper terminations. This method has been tried, and found effectual, even in a house standing in a very disadvantageous situation, namely, under a lofty mountain to the southward, from which currents of wind were blown down upon it. A vent was carried up with a vertical axis, without angles, and several inches wider at the top than at the bottom: the funnel was contracted in a throat directly above the fire-place, and widened gradually upwards. The house has, now, not only ceased to smoke, but, when the doors stand open, the draught is so strong that it will carry a piece of paper up to the top of the chimney. We, therefore, recommend this method to general adoption, as it will be found to possess many advantages.

The following method of curing smoky chimneys has been repeatedly found successful. Reduce the height of the mantle to about one-third that of the room, and carry the jambs and breasts upright, at least, as far as the cieling, then let them be sloped off very gradually. The jambs from the hearth to the mantle should describe a regular curve; and make the lower part of the mantle a broad horizontal plane: lastly, make the distance from the inside of the breast to the back, on each side of the throat, from ten to fourteen, or sixteen inches, according to the size of the chimney. See FIRE-PLACE.

Smoky chimneys are frequently occasioned by their being so very narrow as scarcely to

admit the children, usually employed for the purpose of sweeping them, to reach properly to the top. This evil may be remedied, and that inhuman practice rendered unnecessary, by adopting the following mode, which has been used for time immemorial in Edinburgh, Glasgow, and other cities in the north.

Procure a rope for the purpose, twice the length of the height of the chimney, to the middle of which is to be tied a bush (of broom, furze, &c.) sufficiently large to fill the chimney. Put one end of the rope down the whole passage; and, if there be any windings in it, a bullet, or round stone, is to be tied to the extremity of the rope, and the wood-end of the bush introduced after the rope has descended into the chamber, where a person must pull it downward. By the elasticity of its twigs, the bush sweeps the sides of the chimney as it descends, and carries the soot with it. Should it be necessary for the man at the top, who has hold of the other end of the rope, to draw the bush up again, the person below must turn the latter, so as to send the wood-end uppermost, before he gives notice to the assistant at the top to pull it upwards. Chimneys thus cleaned never require one-tenth part of the repairs, rendered necessary where they are swept by children: for, as these are obliged to work themselves up, by pressing their knees and feet on one side, and their backs on the other, they not unfrequently force out the bricks that divide the chimneys. This is the chief cause why, in many houses of the metropolis, a fire in one apartment always fills the adjoining ones with smoke, and sometimes even the neighbouring house. Whole buildings have often been burnt down, from this concealed cause; as a foul chimney, taking fire, communicates it by these apertures to empty apartments, or to such as were filled with lumber; and in which it was thought unnecessary to make any search, after the fire had been extinguished in the chimney where it first began.

CHI'MNEY-CORNER. *s.* The fire-side: proverbially the place of idlers (*Denham*).

CHI'MNEY-MONEY. See HEARTH-MONEY.

CHI'MNEYPIECE. *s.* The ornamental piece round the fire-place (*Swift*).

CHI'MNEYSWEEPER. *s.* One whose trade is to clean foul chimneys of soot (*Shaks.*). The overseers, &c. of any parish, may bind any boy of the age of eight years or upwards, who is chargeable to the parish, to any person using the trade of a chimney-sweeper, till he shall attain the age of 16 years, provided that it be done with the consent of the parent of such boy. And no master shall have more than six apprentices at one time. Every master shall cause his name and place of abode to be put upon a brass plate, and to be fixed upon the front of a leathern cap, which he shall provide for each apprentice, who shall wear the same when out upon his duty; on pain of forfeiting for every such apprentice, above such number, or without having such cap, not exceeding 10*l.* nor less than 5*l.*

The evils of this disagreeable and unwholesome occupation to those engaged in it are generally acknowledged, and of late years the public attention has been directed to this subject, and premiums offered for the discovery of methods which might be substituted to a practice so offensive to humanity.

In the year 1802, a number of public-spirited and wealthy persons associated for this purpose, and offered considerable premiums to those who might invent and bring into practice a method of cleansing chimneys, by mechanical means, that should supersede the necessity of climbing boys. Feeling themselves, perhaps, inadequate to the task of carrying their laudable intentions into full execution, they applied to the "Society for the Encouragement of Arts, Manufactures," &c. in the Adelphi, requesting them to engage in it, and to offer premiums on the subject. In consequence of this application, the society offered their gold medal to the person who should invent the most effectual mechanical or other means for cleansing chimneys from soot, and obviating the necessity of children being employed within the flues. In a few months there were five candidates for this premium, whose several inventions were put to the test of experiment upon chimneys not less than 70 feet high. Of these, the best are those of Mr. George Smart, the ingenious inventor of hollow masts, and of Mr. Joseph Davis. These are now so well known as to need no minute description; and we hope that one or other of them will soon become so extensively known and used, as entirely to supersede the necessity of employing climbing boys. The London Society for bettering the Condition of the Poor have been very active in rescuing this neglected and despised class of beings from their dismal situation; and, among other laudable efforts, have established institutions for their clothing and education on Sundays.

CHIN. *s.* (cinne, Sax.) The part of the face beneath the upper lip (*Dryden*).

CHINA, an extensive empire in Asia, bounded on the north by Tartary, from which it is separated by a great wall 500 leagues in length; on the east by the Yellow Sea, and the China Sea; on the south by the latter sea, and the kingdoms of Tonquin, Laos, and Burmah; and on the west by Thibet. It lies between 20. and 41 N. lat. and between 100. and 125 E. lon. being 2000 miles from N. to S. and 1,500 from E. to W. and occupying 1,297,299 square miles. This country contains 15 provinces, exclusive of that of Lyantong, which is situated without the great wall. These provinces contain 4,402 walled cities, divided into classes, the civil and the military: the civil class contains 2,045, and the military 2,357. The civil class is divided into three other classes, namely, the first class, called *fou*; the second, called *tcheou*; and the third, called *hien*. The names of the provinces are, 1. Shensi; 2. Shansi; 3. Pecheli; which are situated on the north side, along the wall. 4. Shantong; 5. Kyan-nang; 6. Che-

kyang; 7. Fo-kyen; which are situated along the eastern ocean. 8. Quang-tong; 9. Quang-si; 10. Yu-nang; 11. Se-chuen; which stretch themselves towards the south and southwest And 12. Honan; 13. Hu-quand; 14. Quey-chew; 15. Kyang-si; which take up the middle part. This country probably owes its name to a Chinese word, signifying *middle;* from a notion the natives had that their country lay in the middle of the world. Except to the north, China is a plain country, and contains no remarkable mountains. Its chief rivers and waters are the Yamour and the Argun, which are the boundary between the Russian and Chinese Tartary; the Croceus, or Whambo, or the Yellow River; the Kiam, or the Blue River, and the Tay. Common water in China is very indifferent, and in some places boiled to make it fit for use. The chief of its bays are those of Nankin and Canton. Its canals, however, are sufficient to entitle the ancient Chinese to the character of a most wise and industrious people. The commodiousness and length of these are incredible. The chief of them are lined with hewn stone on the sides, and they are so deep, that they carry large vessels, and sometimes they extend above 1000 miles in length. Those vessels are fitted up for all the conveniences of life; and it has been thought by some, that in China the water contains as many inhabitants as the land. They are furnished with stone quays, and sometimes with bridges of an amazing construction. The navigation is slow, and the vessels sometimes drawn by men. No precautions are wanting, that could be formed by art or perseverance, for the safety of the passengers, in case a canal is crossed by a rapid river, or exposed to torrents from the mountains. These canals, and the variety that is seen upon their borders, render China delightful in a very high degree, as well as fertile, in places that are not so by nature.

According to the statement of the population of China, delivered to lord Macartney, at his request, by Chowta-Zhin, a Chinese mandarin, and which was founded on documents taken from one of the public offices in Pekin, the number of inhabitants in China is no less than 333,000,000. This estimate sir George Staunton defends, and gives a variety of reasons, from circumstances almost peculiar to China, to account for this great population; observing in conclusion, that from this statement it appears, that China contains, upon an average, about one-third more inhabitants than are found upon an equal quantity of land, in the most populous country in Europe. This country runs through so many climates, that the air is very different in the northern and southern provinces. The south of China, which lies under the tropic of Cancer, is excessively hot, and has its annual periodical rains, as other countries under the same parallels. The middle of China enjoys a temperate climate and a serene atmosphere. The north is cold, and subject to the same inclemencies of weather to which other northern countries are. In this variety of climates they have all the fruits which are found either in hot or cold countries. Their soil is fruitful, and they spare no pains in improving it. There is scarcely a spot of ground which lies barren. Their hills are cut into terraces, which they embank, and water well, if there be a spring on the hill. This is particularly necessary in this country, and especially in their rice grounds, which will not thrive, unless they are plentifully watered. The tea-plant is peculiar to China, which produces enough to furnish the world. The green and the bohea are the same plant, but gathered at different times, and differently cured. The chief manufactures are those of silk, cotton, china-ware, and cabinets, or lackered ware. The wrought silks are inexpressibly fine: their atlasses, gold and silver stuffs, are not to be paralleled, any more than the China-ware and cabinets; but in hardware the Europeans excel them infinitely; nor can any of their artificers make a clock, or a watch, or a door or a gun-lock. Their paper is not comparable to that of Europe; but their ink is good, and is brought over in oblong cakes. The Chinese surpass us in the art of managing kitchen gardens, and have a number of vegetables unknown to us. They cultivate even the bottom of their waters, the beds of their lakes, ponds, and rivulets, producing crops unknown to us, particularly of the *pitsi*, or water-chesnut, the fruit of which (found in a cover formed by its root) is exceedingly wholesome, and of a very delicate taste. Among the trees peculiar to China is the tallow tree, the fruit of which is contained in a husk divided into three spherical segments, which open when it is ripe, and discover three white grains of the size of a small walnut, the pulp of which has all the properties of tallow: the wax-tree, producing a kind of white wax almost equal to that made by bees: the tsi-chu, or varnish-tree, which produces the admirable Chinese varnish: the tie-ly-mon, or iron wood, which is so hard and heavy, that it sinks in water, and the anchors of the Chinese ships of war are made of it: the camphire-tree: the bamboo reeds, &c. The flowering shrubs, herbs, and medicinal plants, are too numerous to be recited. The mountains and forests abound with wild animals of every species; but that valuable animal, the musk deer, is peculiar to this country.

The complexion of the Chinese is a sort of tawny, and they have large foreheads, small eyes, short noses, long beards, long ears, and black hair; and those are thought to be most handsome that are most bulky. The women affect a great deal of modesty, and are remarkable for their little feet. The men endeavour to make as pompous an appearance as possible when they go abroad; and yet their houses are mean and low, consisting only of a ground-floor. The government is absolute, and the emperor has the privilege of naming his successor; but the chief mandarin has permission to tell him of his faults. He looks upon his subjects as his children, and professes to govern

them with paternal affection. The Chinese empire is very ancient: it is generally allowed to have continued nearly 4000 years. The annual revenues of the crown, according to sir George Staunton, are about 66,000,000*l.* sterling; and the army in the pay of China, including Tartars, amounts to 1,000,000 infantry, and 800,000 cavalry. The Chinese religion is paganism: they are also taught to consider their emperor as having some divine attributes, particularly as possessing the power of predicting future events; and adoration is paid to him in his absence, on his birth-day, and other grand occasions. In this empire polygamy is allowed. The Chinese pretend to have a great veneration for their ancestors; and some keep images of them in their houses, to which they pay a kind of adoration. They have laws which regulate the civilities and ceremonious salutations they pay to each other; for which reason they always appear to be very good-natured; yet they are reckoned both ill-natured and deceitful. The curiosities of China, and the habits of the Chinese, are more fully detailed in Cruttwell's Gazetteer, and sir George Staunton's Account of Lord Macartney's Embassy to China; to which we must refer.

CHINA. (*China*, so named from the country of China, from whence it was brought.) China root is obtained from the smilax china; caule aculeato, teretiusculo; foliis inermis, ovato cordatis, quinque nerviis, of Linnéus. It was formerly in esteem, as sarsaparilla now is, in the cure of the venereal disease. See SMILAX.

CHINA ROSE. In botany. See HIBISCUS.

CHINA PINK. See DIANTHUS.

CHINA. *s.* (from *China.*) China ware; porcelain; a species of vessels made in China, dimly transparent (*Pope*). See PORCELAIN.

CHINA-ORANGE. *s.* The sweet orange, brought originally from China (*Mortimer*).

CHINA CHINÆ. A name given to the Peruvian bark, as being a native of several parts in China.

CHINCHINA ANGUSTIFOLIA. This bark is obtained from the cinchona angustifolia; foliis lanceolatis, pubescentibus, floribus paniculatis, of Swartz. Its virtues are similar to those of the common Peruvian bark, described under the head CINCHONA. If any thing, it is said to be more adstringent, and to have an aromatic mixture.

CHI'NCHINA CARIBÆ'A. Chinchina jamaicensis. The bark ordered by this title in foreign pharmacopœias, is stripped from the cinchona caribæa; pedunculis unifloris, of Linnéus. It is administered with great success in Jamaica, by Dr. Wright, in remittent fevers.

CHI'NCHINA DE SANTA FE. There are several species of bark sent from Santa fè: but neither their particular natures, nor the trees which afford them, are yet accurately determined.

CHI'NCOUGH. *s.* (*kincken*, to pant, Dutch, and *cough.*) A violent and convulsive cough, to which children are subject.

CHINE. *s.* (*eschine*, French.) 1. The part of the back in which the spine or backbone is found (*Sidney*). 2. A piece of the back of an animal (*Shakspeare*).

To CHINE. *v. a.* To cut into chines (*Dryden*).

CHINESE, that which relates or belongs to China.

CHINESE LANGUAGE, is an object of such curiosity to literary men, that it would be unpardonable to omit a description of it. Of the origin of the characters which are used by this singular people, the late lamented and illustrious president of the Asiatic Society gives the following account from a Chinese writer named *Li Yang Ping*. "The earliest of them were nothing more than the outlines of visible objects, earthly and celestial; but as things merely intellectual could not be expressed by those figures, the grammarians of China contrived to represent the various operations of the mind by metaphors drawn from the productions of nature. Thus, the idea of roughness and of rotundity, of motion and rest, were conveyed to the eye by signs representing a mountain, the sky, a river, and the earth. The figures of the sun, the moon, and the stars, differently combined, stood for smoothness and splendour, for any thing artfully wrought, or woven with delicate workmanship. Extension, growth, increase, and many other qualities, were painted in characters taken from the clouds, from the firmament, and from the vegetable part of the creation. The different ways of moving, agility and slowness, idleness and diligence, were expressed by various insects, birds, fishes, and quadrupeds. In this manner passions and sentiments were traced by the pencil, and ideas not subject to any sense were exhibited to the sight; until by degrees new combinations were invented, new expressions added, the characters deviated imperceptibly from their primitive shape, and the Chinese language became not only clear and forcible, but rich and elegant in the highest degree." Asiatic Researches, vol. ii. Mem. 13.

Of this language, both as it is spoken and written, sir George Staunton has given an account so clear and scientific, that it will undoubtedly place him high amongst the philologists of the 18th century. As there is nothing relating to the Chinese more wonderful than their language, which is very little understood in Europe, we shall lay before our readers a pretty copious abstract of what he says on the subject.

"In the Chinese tongue (says sir George) the sounds of letters in most alphabets are utterly unknown, and the organs of a native advanced in life cannot pronounce them. In endeavouring to utter the sounds of B, D, R, and X, for instance, he substitutes some other sounds to which the same organ has been accustomed; L for R, and, as we have reason to think from some expressions of sir William Jones's, F for B. The nice distinctions between the tones and accents of words nearly resembling each other in sound, but varying

much in sense, require a nicety of ear to distinguish, and of vocal powers to render them exactly. Synonymous words are therefore frequently introduced in Chinese dialogue to prevent any doubt about the intended sense; and if in an intricate discussion any uncertainty should still remain as to the meaning of a particular expression, recourse is had to the ultimate criterion of tracing with the finger in the air, or otherwise, the form of the character, and thus ascertaining at once which was meant to be expressed. In a Chinese sentence there is no marked distinction of substantives, adjectives, or verbs; nor any accordance of gender, number, and case. A very few particles denote the past, the present, and the future; nor are those auxiliaries employed when the intended time may be otherwise inferred with certainty. A Chinese who means to declare his intention of departing to-morrow, never says that he will depart to-morrow; because the expression of the morrow is sufficient to ascertain that his departure must be future. The plural number is marked by the addition of a word, without which the singular always is implied. Neither the memory nor the organs of speech are burthened with the pronunciation of more sounds to express ideas than are absolutely necessary to mark their difference. The language is entirely monosyllabic. A single syllable always expresses a complete idea. Each syllable may be sounded by an European consonant preceding a vowel, sometimes followed by a liquid. Such an order of words prevents the harshness of succeeding consonants sounding ill together; and renders the language as soft and harmonious as the Italian is felt to be, from the rarity of consonants, and the frequency of its vowel terminations.

"The names, or sounds, by which men may be first supposed to have distinguished other animals, when occasion offered to designate them in their absence, were attempts at an imitation of the sounds peculiar to those beings; and still, in Chinese, the name, for example, of a cat, is a pretty near resemblance of its usual cry. It occurred as naturally to endeavour, in speaking, to imitate the voice, if practicable, as it was in writing to sketch a rude figure of the object of description. It is observable, that the radical words of most languages, separated from the servile letters, which mark their inflections, according to their conjugations or declensions, are monosyllabic. A part of each radical word is retained in composition to denote the meaning and etymology of the compound, which thus becomes polysyllabic; but the Chinese grammarians, aware of the inconvenience resulting from the length and complication of sounds, confined all their words, however significant of combined ideas, to single sounds; and retained only in writing some part at least of the form of each character denoting a simple idea, in the compound characters conveying complex ideas."

This is a very plausible, and perhaps the true, account of the monosyllabic form of the Chinese language; but it is proper to state the different account which is given of this peculiarity by sir William Jones. "It has arisen," according to him, "from the singular habits of the people; for though their common tongue be so musically accented as to form a kind of recitative, yet it wants those grammatical accents without which all human tongues would appear monosyllabic. Thus Amita, with an accent on the first syllable, means, in the Sanscrit language, immeasurable, and the natives of Bengal pronounce it Omito; but when the religion of Buddha, the son of Maya, was carried into China, the people of that country, unable to pronounce the name of their new god, called him Foe, the son of Mo-ye; and divided his epithet Amita into three syllables O-mi-to, annexing to them certain ideas of their own, and expressing them in writing by three distinct symbols. Hence it is that they have clipped their language into monosyllables, even when the ideas expressed by them, and the written symbols for those ideas, are very complex."

"In the Chinese language," sir George Staunton informs us, "that there is a certain order, or settled syntax, in the succession of words in the same sentence; a succession fixed by custom, differently in different langnages, but founded on no rule or natural order of ideas, as has been sometimes supposed; for though a sentence consists of several ideas, to be rendered by several words, these ideas all exist and are connected together in the same instant; forming a picture or image, every part of which is conceived at once. The formation of Chinese sentences is often the simplest and most artless possible, and such as may naturally have occurred at the origin of society. To interrogate, for example, is often at least to require the solution of a question, whether the subject of doubt be in a particular way or the contrary; and accordingly a Chinese inquiring about his friend's health, will sometimes say, *hou, poo hou?* The literal meaning of which words is, 'well, not well?' A simple character repeated stands sometimes for more than one of the objects which singly it denotes, and sometimes for a collective quantity of the same thing. The character of *moo* singly is a tree, repeated is a thicket, and tripled is a forest.

"In Chinese there are scarcely fifteen hundred distinct sounds. In the written language there are at least eighty thousand characters or different forms of letters, which number divided by the first gives nearly fifty senses or characters upon an average to every sound expressed; a disproportion, however, that gives more the appearance than the reality of equivocation and uncertainty to the oral language of the Chinese.

"The characters of the Chinese language were originally traced, in most instances, with a view to express either real images, or the allegorical signs of ideas: a circle, for example, for the sun, and a crescent for the moon. A man was represented by an erect figure, with lines to mark the extremities. It was evident

that the difficulty and tediousness of imitation will have occasioned soon a change to traits more simple and more quickly traced. Of the entire figure of a man, little more than the lower extremities only continue to be drawn, by two lines forming an angle with each other. A faint resemblance, in some few instances, still remains of the original forms in the present hieroglyphic characters; and the gradation of their changes is traced in several Chinese books. Not above half a dozen of the present characters consist each of a single line; but most of them consist of many, and a few of so many as seventy different strokes. The form of those characters has not been so flux as the sound of words, as appears in the instance of almost all the countries bordering on the Chinese sea or Eastern Asia, where the Chinese written, but not the oral, language, is understood; in like manner, as one form of Arabic figures to denote numbers, and one set of notes for music, are uniform and intelligible throughout Europe, notwithstanding the variety of its languages.

"A certain order or connection is to be perceived in the arrangement of the written characters of the Chinese; as if it had been formed originally upon a system to take place at once, and not grow up, as other languages, by slow and distant intervals. Upwards of two hundred characters, generally consisting each of a few lines or strokes, are made to mark the principal objects of nature, somewhat in the manner of bishop Wilkins's divisions, in his ingenious book on the subject of universal language, or real character. These may be considered as the genera or roots of language, in which every other word or species, in a systematic sense, is referred to its proper genus. The heart is a genus, of which the representation of a curve line approaches somewhat to the form of the object; and the species referable to it include all the sentiments, passions, and affections, that agitate the human breast. Each species is accompanied by some mark denoting the genus or heart. Under the genus *hand* are arranged most trades and manual exercises. Under the genus *word* every sort of speech, study, writing, understanding, and debate. A horizontal line marks a unit; crossed by another line it stands for ten, as it does in every nation which repeats the units after that number. The five elements, of which the Chinese suppose all bodies in nature to be compounded, form so many genera, each of which comprehends a great number of species under it. As in every compound character or species, the abridged mark of the genus is discernible by a student of that language, in a little time he is enabled to consult the Chinese dictionary, in which the compound characters or species are arranged under their proper genera. The characters of these genera are placed at the beginning of the dictionary, in an order which, like that of the alphabet, is invariable, and soon becomes familiar to the learner. The species under each genus follow each other, according to the number of strokes of which each consists, independently of the one or few which serve to point out the genus. The species wanted is thus soon found out. Its meaning and pronunciation are thus given through other words in common use; the first of which denotes its signification and the other its sound. When no one common word is found to render exactly the same sound, it is communicated by two words with marks, to inform the inquirer that the consonant of the first word and the vowel of the second joined together form the precise sound wanted.

"The composition of many of the Chinese characters often displays considerable ingenuity, and serves also to give an insight into the opinions and manners of the people. The character expressive of happiness includes abridged marks of land, the source of their physical, and of children that of their moral, enjoyments. This character, embellished in a variety of ways, is hung up almost in every house. Sometimes written by the hand of the emperor, it is sent by him as a compliment, which is very highly prized, and such as he was pleased to send to the embassador.

"Upon the formation, changes, and allusions of compound characters, the Chinese have published many thousand volumes of philological learning. Nowhere did criticism more abound, or is more strict. The introduction or alteration of a character is a serious undertaking, and seldom fails to meet with opposition. The most ancient writings of the Chinese are still classical amongst them. The language seems in no instance to have been derived from or mixed with any other. The written seems to have followed the oral language soon after the men who spoke it were formed into a regular society. Though it is likely that all hieroglyphical languages were originally founded on the principles of imitation, yet in the gradual progress towards arbitrary forms and sounds, it is probable that every society deviated from the originals in a different manner from the others; and thus for every independent society there arose a separate hieroglyphic language. As soon as a communication took place between any two of them, each would hear names and sounds not common to both; each reciprocally would mark down such names in the sounds of its own characters, bearing, as hieroglyphics, a different sense. In that instance, consequently, those characters cease to be hieroglyphics, and were merely marks of sound. If the foreign sounds could not be expressed but by the use of a part of two hieroglyphics, in the manner mentioned to be used sometimes in Chinese dictionaries, the two marks joined together become in fact a syllable. If a frequent intercourse should take place between communities speaking different languages, the necessity of using hieroglyphics merely as marks of sound would frequently recur. The practice would lead imperceptibly to the discovery that, with a few hieroglyphics every sound of the foreign language might be expressed; and the hieroglyphics which answered best this purpose,

either as to exactness of sound or simplicity of form, would be selected for this particular use; and serving as so many letters, would form in fact together what is called an alphabet. Thus, the passage from hieroglyphic to alphabetic writing may naturally be traced, without the necessity of having ‘ recourse to divine instruction, as some learned men have conjectured, on the ground that the art of writing by an alphabet is too refined and artificial for untutored reason.’

“ The Chinese printed character is the same as is used in most manuscripts, and is chiefly formed of straight lines in angular positions, as most letters are in eastern tongues, especially the Sanscrit; the characters of which, in some instances, admit of some additions to their original form, producing a modification of the sense. A running hand is used by the Chinese only on trivial occasions, or for private notes, or for the ease and expedition of the writer; and differs from the others as much as an European manuscript does from print. There are books with alternate columns of both kinds of writing for their mutual explanation to a learner.

“ The principal difficulty in the study of Chinese writings arises from the general exclusion of the auxiliary particles of colloquial language, that fix the relation between indeclinable words, such as are all those of the Chinese language. The judgment must be constantly exercised by the student, to supply the absence of such assistance. That judgment must be guided by attention to the manners, customs, laws, and opinions of the Chinese, and to the events and local circumstances of the country, to which the allusions of language perpetually refer. If it in general be true, that a language is difficult to be understood in proportion to the distance of the country where it is spoken, and that of him who endeavours to acquire it, because in that proportion the allusions to which language has continually recourse are less known to the learner, some idea may be conceived of the obstacles which an European may expect to meet in reading Chinese, not only from the remoteness of situation, but from the difference between him and the native of China in all other respects. The Chinese characters are in fact sketches or abridged figures, and a sentence is often a string of metaphors. The different relations of life are not marked by arbitrary sounds, simply conveying the idea of such connection; but the qualities naturally expected to arise out of such relations, become frequently the name by which they are respectively known. Kindred, for example, of every degree, is thus distinguished with a minuteness unknown in other languages. That of China has distinct characters for every modification known by them of objects in the physical and intellectual world. Abstract terms are no otherwise expressed by the Chinese than by applying to each the name of the most prominent objects to which it might be applied, which is likewise indeed generally the case of other languages. Among the Latins the abstract idea of virtue, for example, was expressed under the name of valour or strength (*virtus*), being the quality most esteemed among them, as filial piety is considered to be in China. The words of an alphabetic language being formed of different combinations of letters, or elemental parts, each with a distinct sound and name, whoever knows and combines these together, may read the words without the least knowledge of their meaning; not so hieroglyphic language, in which each character has indeed a sound annexed to it, but which bears no certain relation to the unnamed lines or strokes of which it is composed. Such character is studied and best learned by becoming acquainted with the idea attached to it; and a dictionary of hieroglyphics is less a vocabulary of the terms of one language with the correspondent terms of another, than an encyclopædia containing explanations of the ideas themselves represented by such hieroglyphics. In such sense only can the acquisition of Chinese words be justly said to engross most of the time of men of learning among them. The knowledge of the sciences of the Chinese, however imperfect, and of their most extensive literature, is certainly sufficient to occupy the life of man. Enough, however, of the language is imperceptibly acquired by every native, and may, with diligence, be acquired by foreigners, for the ordinary concerns of life; and further improvements must depend on capacity and opportunity.”

Chinese wheel is an engine employed in the province of Kiang-see, and probably through the whole empire, for raising water from rivers to irrigate plantations of sugar canes, on a sandy soil, considerably elevated above the level of the river. By sir George Staunton, who says that it is ingenious in its contrivance, cheap in its materials, easy in its operation, and effectual to its purpose, it is thus described:

“ Two hard wood-posts or uprights are firmly fixed in the bed of the river, in a line perpendicular to its bank. These posts support the axis, about ten feet in length, of a large and durable wheel, consisting of two unequal rims, the diameter of one of which, closest to the bank, being about fifteen inches shorter than that of the outer rim; but both dipping in the stream, while the opposite segment of the wheel rises above the elevated bank. This double wheel is connected with the axis, and is supported by 16 or 18 spokes obliquely inserted near each extremity of the axis, and crossing each other at about two-thirds of their length. They are there strengthened by a concentric circle, and fastened afterwards to the rims: the spokes inserted in the interior extremity of the axis reaching the outer rim, and those proceeding from the exterior extremity of the same axis, reaching the inner and smaller rim. Between the rims and the crossing of the spokes is woven a kind of close basket-work, serving as ladle-boards or floats, which meeting successively the current of the stream,

obey its impulse, and turn round the wheel. To both its rims are attached small tubes or spouts of wood, with an inclination of about 25 degrees to the horizon, or to the axis of the wheel. The tubes are closed at their outer extremity, and open at the opposite end. By this position, the tubes which happen in the motion of the wheel to be in the stream with their mouths or open ends uppermost, fill with water. As that segment of the wheel rises, the mouths of the tubes attach to it, alter their relative inclination, but not so much as to let their contents flow out till such segment of the wheel becomes the top. The mouths of those tubes are then relatively depressed, and pour the water into a wide trough placed on posts, from whence it is conveyed as may be wanted among the canes.

"The only materials employed in the construction of this water-wheel, except the nave or axis, and the posts on which it rests, are afforded by the bamboo. The rims, the spokes, the ladle-boards or floats, and the tubes or spouts, and even the cords, are made of entire lengths, or single joints, or large pieces, or thin slices, of the bamboo. Neither nails, nor pins, nor screws, nor any kind of metal enters into its construction. The parts are bound together firmly by cordage, also of slit bamboo. Thus, at a very trifling expence, is constructed a machine which, without labour or attendance, will furnish, from a considerable depth, a reservoir with a constant supply of water adequate to every agricultural purpose.

"These wheels are from 20 to 40 feet in diameter, according to the height of the bank and consequent elevation to which the water is to be raised. Such a wheel is capable of sustaining with ease 20 tubes or spouts, of the length of four feet, and diameter two inches in the clear. The contents of such a tube would be equal to six-tenths of a gallon, and a periphery of 20 tubes, twelve gallons. A stream of a moderate velocity would be sufficient to turn the wheel at the rate of four revolutions in one minute, by which would be lifted 48 gallons of water in that short period; in one hour, 2880 gallons; and 69,120 gallons, or upwards of 300 tons of water, in a day."

Sir George, who saw this wheel in motion, thinks it preferable in many respects to any machine yet in use for similar purposes. He observes, that, while it approaches near to the Persian wheel, it is more simple than that wheel in its contrivance, and much less expensive.

CHINK. *s.* (cınan, to gape, Saxon.) 1. A small aperture longwise (*Swift*). 2. A small sharp sound made by the collision of metal, and by shaking money in a purse. 3. Money, in burlesque.

To Chink. *v. a.* To shake so as to make a sound (*Pope*).

To Chink. *v. n.* To sound by striking each other (*Arbuthnot*).

CHINKED. In botany (*rimosus*), applied to the outer bark of trees, especially old ones.

CHI'NKY. *a.* (from *chink.*) Full of holes; gaping; opening in narrow clefts (*Dryden*).

CHINNOR, an Hebrew musical instrument having 32 chords. For its figure, see Plate 40.

CHINON, an ancient town of France, in the department of Indre and Loire, and late province of Touraine. It is seated on the river Vienne; and was the birth-place of Rabelais and of Quillet. Lat. 47. 12 N. Lon. 0. 22 E.

CHINQUAPIN. In botany. See Fagus.

CHINSURA, a town of Hindustan, in the country of Bengal, situated on the west side of the Ganges, belonging to the Dutch: the houses are built in the European style: the town is populous and commercial. The fortress is defended by four bastions and a ditch, according to the European form of military architecture: twenty-four cannons defend the passage of the river: seventeen miles N. Calcutta.

CHINTS. *s.* Cloth of cotton made in India, and printed with colours (*Pope*).

CHIO, or Chios, an Asiatic island, now called Scio.

Chio turpentine. Terebinthina de Chio. Cyprus turpentine. Chian turpentine. This substance is classed among the resins. It is procured by wounding the bark of the trunk of the pistachia terebinthus of Linnéus. The best Chio turpentine is about the consistence of honey, very tenacious, clear, and almost transparent; of a white colour, inclining to yellow, and of a fragrant smell, moderately warm to the taste, and free from acrimony and bitterness. Its medical qualities are similar to those of the turpentines. See Turpentines.

CHIOCOCCA. Strawberry-tree. In botany, a genus of the class pentandria, order monogynia; corol funnel-form, equal; berry one-celled, two-seeded, inferior. Two species; West Indies and Friendly Isles.

CHIONANTHUS. Snow-drop-tree. In botany, a genus of the class diandria, order monogynia; Corol four-cleft, the divisions extremely long; drupe with a striate nut. Five species; East Indies, West Indies, and America; of which the chief are:

1. C. Virginiana. A Carolina shrub with white flowers; panicle terminal, three-cleft; peduncles three-flowered; leaves acute.

2. C. compacta. A Caribbean tree fifteen feet high, with panicles trichotomous, the last flowers subcapitate; calyxes villous; leaves lanceolate oblong; anthers pointed.

CHIONE, in fabulous history. The most celebrated of this name is the daughter of Dædalion, of whom Apollo and Mercury became enamoured. To enjoy her company Mercury lulled her to sleep with his Caduceus, and Apollo, in the night, under the form of an old woman, obtained the same favours as Mercury. Chione grew so proud of her commerce with the gods, that she even preferred her beauty to that of Juno, for which impiety she was killed by the goddess, and changed into a hawk. (*Ovid.*)

CHIONIDES, an Athenian poet, supposed by some to be the inventor of comedy.

CHIOS. See SCIO.

CHIOZZO, an ancient episcopal town of Venice. Lat. 45. 47 N. Lon. 12. 9 E.

CHIP, CHEAP, CHIPPING, in the names of places, imply a market; from the Saxon cyppan ceapan, to buy (*Gibson*).

To CHIP. *v. a.* (from *chop.*) To cut into small pieces; to diminish by cutting away a little at a time (*Thomson*).

CHIP. *s.* (from the verb.) 1. A small piece taken off by a cutting instrument (*Taylor*). 2. A small piece, however made (*Woodward*).

CHIPPENHAM, a town of Wiltshire, having a market on Saturdays. It sends two members to parliament. Here is a manufacture of fine woollen cloth. Lat. 51. 27 N. Lon. 2. 8 W.

CHI'PPING. *s.* A fragment cut off (*Mortimer*).

CHIPPING NORTON, a town of Oxfordshire, having a market on Wednesdays. Lat. 51. 55 N. Lon. 1. 17 W.

CHIPPING ONGAR, a town of Essex, with a market on Saturdays. Lat. 51. 43 N. Lon. 0. 16 E.

CHIPPING WYCOMB. See WYCOMB.

CHIRAGRA, (*chiragra*, χειραγρα; from χειρ, the hand, and αγρα, a seizure). The gout in the joints of the hand, as *podagra* (ποδαγρα), means radically the gout in the feet; which, from its being the most usual seat of affection, became at length among both Greeks and Romans a name for the gout in general.

CHIRA'GRICAL. *a.* (from *chiragra*, Lat.) Having the gout in the hand (*Brown*).

CHIRAMAXIUM, in antiquity, a kind of chariot drawn by men.

CHIROGRAPH was anciently a deed, which, requiring a counterpart, was engrossed twice on the same piece of parchment, counterwise; leaving a space between, wherein was written chirograph, through the middle whereof the parchment was cut; sometimes straight, sometimes indentedly; and a moiety given to each of the parties. This was afterwards called dividenda, and chartæ divisæ; and was the same with what we now call charter-party. (See CHARTER-PARTY.) The first use of these chirographs with us was in the time of Henry III.

CHIROGRAPH was also anciently used for a fine: and the manner of engrossing the fines, and cutting the parchment in two pieces, is still retained in the office called the chirographer's office.

CHIRO'GRAPHER. *s.* (χειρ, the hand, and γραφω, to write.) He that exercises or professes the art of writing (*Bacon*).

CHIRO'GRAPHIST. *s.* One that tells fortunes by examining the hand (*Arbuthnot*).

CHIRO'GRAPHY. *s.* The art of writing.

CHI'ROMANCER. *s.* One that foretels future events by inspecting the hand (*Dryden*).

CHI'ROMANCY. *s.* (χειρ, the hand, and μαντις, a prophet.) The art of foretelling the events of life, by inspecting the hand (*Brown*).

CHIRON, a famous personage of antiquity, styled by Plutarch, in his dialogue on music, "the wise centaur." Sir Isaac Newton places his birth in the first age after Deucalion's deluge, commonly called the golden age; and adds, that he formed the constellations for the use of the Argonauts, when he was 88 years old; for he was a practical astronomer, as well as his daughter Hippo: he may, therefore, be said to have flourished in the earliest ages of Greece, as he preceded the conquest of the Golden Fleece, and the Trojan war. He is generally called the son of Saturn and Phillyra; and is said to have been born in Thessaly among the centaurs, who were the first Greeks that had acquired the art of breaking and riding horses: whence the poets, painters, and sculptors, have represented them as a compound of man and horse; and perhaps it was at first imagined by the Greeks, as well as by the Americans, when they first saw cavalry, that the horse and the rider constituted the same animal. Chiron was represented by the ancients as one of the first inventors of medicine, botany, and chirurgery. Achilles was among his disciples. After his death he was placed, by Musæus, among the constellations under the name of Sagittarius.

CHIRONIA. Centaury. In botany, a genus of the class pentandria, order monogynia. Corol salver-shaped; stamens inclining into the tube; anthers becoming spiral; style declining; pericarp of two inflated valves. Sixteen species; chiefly of the Cape, and south of Europe, but two or three indigenous to our own country, especially c. centaurium with stem herbaceous dichotomously panicled; leaves ovate-lanceolate; calyx shorter than the tube. The common lesser centaury of our pastures, and the officinal flower of this name. See CENTAUREAM.

CHIRONOMY, in antiquity, the art of representing any past transaction by the gestures of the body, more especially by the motions of the hands.

CHIROTONY, originally a method of electing magistrates, by holding up the hands: among ecclesiastics it denotes the imposition of hands in conferring priestly orders.

To CHIRP. *v. n.* (from *cheer up.*) To make a cheerful noise: as birds (*Sidney*).

To CHIRP. *v. a.* To make cheerful (*Pope*).

CHIRP. *s.* The voice of birds or insects (*Spectator*).

CHI'RPER. *s.* (from *chirp.*) One that chirps.

To CHIRRE. *v. n.* (ceoɲian, Saxon.) To coo as a pigeon (*Junius*).

CHIRU'RGEON. *s.* (χειρουργος.) One that cures ailments, not by internal medicines, but outward applications; a surgeon (*South*).

CHIRURGIA, (*chirurgia*, χειρεργια; from χειρ, the hand, and εργον, a work; because surgical operations are performed by the hand). Surgery.

CHIRU'RGERY. *s.* (from *chirurgeon.*) The art of curing by external applications (*Sidney*).

CHIRU'RGICAL. CHIRU'RGICK. *a.* 1. Having qualities useful in outward applications to hurts (*Mortimer*). 2. Manual in general (*Wilkins*).

CHISSEL, or CHISEL, an instrument much used in sculpture, masonry, joinery, carpentry, &c. There are chissels of various kinds; though their chief difference lies in their different size and strength, as being all made of steel well sharpened and tempered: but they have appropriate names, according to the several uses to which they are applied. They are likewise distinguished, according to the breadth of the blade, into inch chissels, half-inch chissels, &c.

To CHISSEL. *v. a.* To cut with a chissel.

CHIT, the name of an instrument used in cleaving laths.

CHIT. *s.* (*chico*, little, Spanish.) A child; a baby (*Addison*). 2. The shoot of corn from the end of the grain (*Mortimer*). 3. A freckle.

To CHIT. *v. n.* To sprout (*Mortimer*).

CHI'TCHAT. *s.* (from *chat.*) Prattle; idle prate; idle talk (*Spectator*).

CHITON. In zoology, a genus of the class vermes, order testacea. Animal inhabiting the shell a doris; shell consisting of several segments or valves dispersed down the back. Twenty-eight species, scattered throughout the globe: of which two or three inhabit the shores of our own country; c. marginatus and c. levis; both eight-valved.

CHITRO, a town of Macedonia, on the bay of Salonicha. It is the ancient Citium, the place where the mother, wife, and son of Alexander the Great were murdered by Cassander. Lat. 40. 20 N. Lon. 22. 35 E.

CHI'TTERLINGS. *s.* (from *schyterlingh*, Dutch.) The guts; the bowels.

CHITTIM, in scripture geography, denote, according to Basnage, the Cuthæans, who inhabited Susiana near Babylon, and who, marching under Nebuchadnezzar, contributed to the siege of Tyre. Calmet supposes that the appellation of Chittim is applied to the Macedonians. But Bochart thinks the Romans are meant by Chittim. In Dan. xi. 30. the Romans seem meant, for the Roman ambassadors sailed to Egypt in ships of Chittim. To us, however, it appears probable that the term may include all Greece, and more particularly the islands of the Archipelago, perhaps up the Bosphorus; for vessels might obviously navigate from thence to Tyre (Isaiah, xxiii. 1.) as they do now to Egypt.

CHI'TTY. *a.* (from *chit.*) Childish; like a baby.

CHI'VALROUS. *a.* (from *chivalry.*) Relating to chivalry; knightly; warlike (*Sp.*).

CHI'VALRY. *s.* (*chevalerie*, French.) 1. Knighthood; a military dignity (*Bacon*). 2. The qualifications of a knight; as, valour, dexterity in arms (*Shakspeare*). 3. The general system of knighthood (*Dryden*). 4. An adventure; an exploit (*Sidney*). 5. The body or order of knights (*Shakspeare*).

CHIVALRY, from *cheval*, a horse; an abstract term, used to express the peculiar privileges, obligations, and turn of mind, with all the other distinguishing characteristics of that order of men who flourished in Europe in the dark ages, during the vigour of the feudal systems of government, under the name of knights, or knights errant.

Chivalry, though founded in caprice, and productive of extravagance, had a very considerable influence in refining the manners of the European nations, during the twelfth, thirteenth, fourteenth, and fifteenth centuries. The objects of this romantic institution were, to check the insolence of over grown oppressors, to succour the distressed, to rescue the helpless from captivity, to protect or to avenge women, orphans, and ecclesiastics, who would not bear arms in their own defence, to redress wrongs, and to remove grievances. Valour, gallantry, and religion, were blended in this institution; men were trained to knighthood by long previous discipline; they were admitted into the order by solemnities, no less devout than pompous. Every person of noble birth courted the honour, it was deemed a distinction superior to royalty, and monarchs are found to have received it from the hands of private gentlemen. These various circumstances contributed to render a whimsical institution of substantial benefit to mankind. See Robertson's History of Charles V. vol. i. p. 82, &c. ed. 2. 8vo.

Chivalry, whatever might be the era of its origin, declined in England during the inglorious reigns of king John and Henry III.; but revived under Edward I. This prince was one of the most accomplished knights of the age in which he flourished, and both delighted and excelled in feats of chivalry. As a proof of this, it will be sufficient to allege, that when he was on his return from the Holy Land after his father's death, and knew that his presence was ardently desired in England, he accepted an invitation to a tournament at Chalons in Burgundy, where he displayed his skill and valour to great advantage, and gained a complete victory. Edward III. was no less fond of chivalry, and encouraged it both by his example and munificence. Having formed the design of asserting his claim to the crown of France, he laboured to inspire his own subjects with a bold enterprising spirit, and to entice as many valiant foreigners as possible into his service.

The respectable author of the Letters on Chivalry and Romance traces, with great ingenuity and erudition, a strong resemblance between the manners of the age of chivalry and those of the old heroic ages delineated by Homer. "There is," says he, "a remarkable correspondence between the manners of the old heroic times, as painted by their great romancer Homer, and those which are represented to us in the modern books of knight-errantry." This is a fact of which no good account can be given, but by another not less certain; that the political states of Greece, in the earliest periods of its story, were similar in many respects to that of Europe, as broken by the feudal system into an infinite number o

petty independent governments. See Hurd's Letters on Chivalry, &c.

Some obvious circumstances of agreement between the heroic and Gothic manners may be worth the reader's attention:

1. The military enthusiasm of the barons is but of a piece with the fanaticism of the heroes. Hence the same particularity of description in the accounts of battles, wounds, deaths, in the Greek poet, as in the Gothic romance. Hence that minute curiosity in the display of their dresses, arms, and accoutrements. The minds of all men being occupied with warlike images and ideas, were much gratified by those details which appear cold and unaffecting to modern readers.

We hear much of knight-errants encountering giants, and quelling savages, in books of chivalry. These giants were oppressive feudal lords, and every lord was to be met with, like the giant, in his strong hold or castle. Their dependents of a lower form, who imitated the violence of their superiors, and had not their castles, but lurking places, were the savages of romance. The greater lord was called a giant for his power; the less, a savage, for his brutality.

2. Another terror of the Gothic ages, was monsters, dragons, and serpents. Their stories were received in those days for several reasons: 1. From the vulgar belief of enchantments: 2. From their being reported on the faith of eastern tradition, by adventurers from the Holy Land: 3. In still later times from the strange things told and believed on the discovery of the new world.

In all these respects, Greek antiquity resembles the Gothic. For what are Homer's Læstrigons and Cyclops, but bands of lawless savages, with each of them a giant of enormous size at their head? And what are the Grecian Bacchus, Hercules, and Theseus, but knights-errant, the exact counterparts of sir Lancelot, and Amadis de Gaul?

3. The oppressions which it was the glory of the knights to avenge, were frequently carried on, as we are told, by the charms and enchantments of women. These charms, we may suppose, are often metaphorical; as expressing only the blandishments of the sex. Sometimes they are taken to be real, the ignorance of those ages acquiescing in such conceits. And are not these stories matched by those of Calypso and Circe, the enchantresses of the Greek poet?

4. Robbery and piracy were honourable in both: so far were they from reflecting any discredit on the ancient or modern *redresses of wrongs*. What account can be given of this, but that, in the feudal times, and in the early days of Greece, when government was weak, and unable to redress the injuries of petty sovereigns, it would be glorious for private adventurers to undertake this work; and, if they could accomplish it in no other way, to pay them in kind by downright plunder and rapine?

5. Bastardy was in credit with both. They were extremely watchful over the chastity of their own women; but such as they could seize upon in the enemies quarter were lawful prize. Or if, at any time, they transgressed in this sort at home, the fault was covered by an ingenious fiction. The offspring was reputed divine. Their greatest heroes were the fruit of goddesses approached by mortals; just as we hear of the doughtiest knights being born of fairies.

6. With the greatest fierceness and savageness of character, the utmost generosity, hospitality, and courtesy, was imputed to the heroic ages. Achilles was at once the most relentless, vindictive, implacable, and the friendliest of men. We have the very same representation in the Gothic romances. As in those lawless times, dangers and distresses of all kinds abounded, there would be the same demand for compassion, gentleness, and generous attachments to the unfortunate, those especially of their own clan, as of resentment, rage, and animosity against their enemies.

7. Again, the martial games celebrated in ancient Greece, on great and solemn occasions, had the same origin, and the same purpose, as the tournaments of the Gothic warriors.

8. Lastly, the passion for adventures, so natural in their situation, would be as naturally attended with the love of praise and glory. Hence the same encouragement, in the old Greek and Gothic times, to panegyrists and poets. In the affairs of religion and gallantry, indeed, the resemblance between the hero and the knight is not so striking. But the religious character of the knight was an accident of the times, and no proper effect of his civil condition. And that his devotion for the fair sex should so far surpass that of the hero, is a confirmation of the system here advanced. For the consideration had of the females in the feudal constitution, will of itself account for this deference. It made them capable of succeeding to fiefs, as well as the men. And does not one see, on the instant, what respect and dependence this privilege would draw upon them?

It was of mighty consequence who should obtain the favour of a rich heiress. And though, in the strict feudal times, she was supposed to be in the power and at the disposal of her superior lord, yet this rigid state of things did not last long. Hence we find some distressed damsel was the spring and mover of every knight's adventure. She was to be rescued by his arms, or won by the fame and admiration of his prowess. The plain meaning of all which was this: That as, in these turbulent times, a protector was necessary to the weakness of the sex, so the courteous and valorous knight was to approve himself fully qualified for that purpose.

It may be observed, that the two poems of Homer were intended to expose the mischiefs and inconveniences arising from the political state of Old Greece: the Iliad, the dissensions that naturally spring up among independent chiefs; and the Odyssey, the insolence of their greater subjects, more especially when unre-

strained by the presence of their sovereign. And can any thing more exactly resemble the condition of the feudal times, when, on occasion of any great enterprise, as that of the crusades, the designs of the confederate Christian states were perpetually frustrated, or interrupted at least, by the dissensions of their leaders; and their affairs at home as perpetually distressed and disordered by the rebellious usurpations of their greater vassals? Jerusalem was to the European, what Troy had been to the Grecian princes. See ROMANCE.

CHIVALRY, or CHEVALRY, in law, a tenure of land by knight-service; whereby the tenant was anciently bound to perform service in war, to the king, or to the mesne lord of whom he held by that tenure.

CHIVALRY (Court of), a court formerly held before the lord high constable and earl marshal of England jointly, and having both civil and criminal jurisdiction: but since the attainder of Stafford duke of Buckingham under Henry VIII. and the consequent extinction of the office of lord high constable, it has usually, with respect to civil matters, been heard before the earl marshal only.

CHIUDENDO, in Italian music, to conclude.

CHIVE. In botany, a term used by some English writers for STAMEN, which see.

CHIVE, is also a name sometimes given to a species of small onion.

CHLAMYS, in antiquity, a military habit worn by the patricians over the tunica.

CHLOEIA, in antiquity, a festival celebrated at Athens, in honour of Ceres, to whom, under the name χλοη, i. e. grass, they sacrificed a ram.

CHLORA. In botany, a genus of the class octandria, order monogynia. Calyx eight-leaved; corol eight-parted; stigma four-cleft; capsule superior, one-celled, two valved, many seeded. Five species; chiefly natives of America, and the south of Europe; but c. perfoliata, is indigenous to the pastures of our own country, and named yellow centaury.

CHLORANTHUS. In botany, a genus of the class tetandria, order monogynia. Calyxless; corol a three-lobed petal seated by the side of the germ; anthers growing to the petal; berry one-seeded. One species only; a fleshy shrub, indigenous to China and Japan.

CHLORASMA, (χλωρασμα, from χλωριαω, to become green). The same as CHLOROSIS, which see.

CHLORIS. In botany, a genus of the class polygamia, order monoecia. Herm: calyx, glume two-valved, two-flowered, awned; corolless; stamens three; styles two; seed one. Male: calyx, glume, one-valved. Fem. sessile: calyx, glume two-valved. Five species; all natives of the West Indies.

CHLORIT SCHISTUS. See SERPENTINUS.

CHLOROGRANATUS. In oryctology, a genus of the class earths, order siliceous: consisting of silica, a large proportion of oxyd of iron and carbonat of lime, with frequently alumine; hard, never opake nor subopake, crystallised: easily fusible in the fire. One species only. Green, becoming honey-yellow in a white heat: one variety in double octangular pyramids, augmented at each point by another triangular pyramid; another variety in sexangular prisms terminating each side in a triangular pyramid. Found in Bohemia, Saxony, and Franconia; and is chiefly used as a flux in iron furnaces.

CHLOROSIS, (χλορωσις; from χλορος, green, pale; from the yellow greenish look those have who are affected with it). The green sickness. A genus of disease in the class cachexiæ, and order impetigines of Cullen. It is a complaint which affects young females who labour under a suppression of the menses. It is characterised by depraved appetite, bad digestion, livid paleness, great debility, palpitation, and suppressed menstruation.

To CHOAK. See CHOKE.

CHO'COLATE. *s.* (*chocolate*, Spanish.) 1. The cake or mass made by grinding the kernel of the cocoa-nut with other substances to be dissolved in hot water (*Chambers*). 2. The liquor made by a solution of chocolate in hot water (*Arbuthnot*).

CHO'COLATE-HOUSE. *s.* A house where company is entertained with chocolate (*Tat.*).

CHOCOLATE-NUT. In botany. See THEOBROMA.

Good, unadulterated chocolate, ought to possess the following properties: a brown colour inclining to red, and rather lively than faint; a smooth surface not affected by mere contact of the hand; a fine and uniform consistence on breaking it, without any granulated particles, which arise from the addition of sugar, employed by the manufacturer to conceal still baser ingredients; lastly, it should easily melt in the mouth, and leave no roughness or astringency, but rather a cooling sensation on the tongue. This last quality is the most decisive criterion of genuine chocolate.

Considered as an article of diet, chocolate is a nutritive and, in general, wholesome food, well adapted to the weak stomachs of invalids and valetudinarians. If duly prepared, and not too much roasted in the nuts (which imparts a dark, rather than reddish, colour to the cakes), it is easily dissolved in a liquid state; and, being quickly assimilated to alimentary matter, it is less flatulent, and oppressive, than most vegetable dishes of a viscid and oily nature. To promote its digestion, it ought not to be used without the addition of aromatic spice, such as cinnamon, cardamoms, vanilla, &c.; which last, however, must be sparingly employed, as it is one of the most heating and stimulating drugs.

CHOCO-VINE. In botany. See SECHIUM.

CHOCZIN, a town of Moldavia, on the confines of Poland, now in the possession of the Russians. Lat. 48. 46 N. Lon. 26. 25 E.

CHODE. The old preterit of *chide*.

CHOENIX, an ancient dry measure, containing the 48th part of a medimnus, or six bushels.

CHOERINCE, a kind of sea-shells, with which the ancient Greeks gave their suffrages.

CHOICE. *s.* (*choix*, French.) 1. The act of choosing; election (*Dryden*). 2. The power of choosing; election (*Grew*). 3. Care in choosing; curiosity of distinction. 4. The thing chosen (*Prior*). 5. The best part of any thing (*Hooker*). 6. Several things proposed at once, as objects of election (*Shaksp.*).

CHOICE. *a.* (*choisi*, French.) 1. Select; of extraordinary value (*Walton*). 2. Chary; frugal; careful (*Taylor*).

CHO'ICELESS. *a.* (from *choice.*) Without the power of choosing (*Hammond*).

CHO'ICELY. *ad.* (from *choice.*) 1. Curiously; with exact choice (*Shakspeare*). 2. Valuably; excellently (*Walton*).

CHO'ICENESS. *s.* (from *choice.*) Nicety; particular value (*Evelyn*).

CHOIR. *s.* (from *chorus*, Latin.) 1. An assembly or band of singers (*Waller*). 2. The singers in divine worship (*Shakspeare*).

CHOIR, that part of the church where choristers sing in divine service. It is separated from the chancel, where the communion is celebrated; and, since the time of Constantine, from the nave of the church, where the people are placed. Though in our cathedrals both the people and the singers are placed in the choir. The patron is said to be obliged to repair the choir of a church.

In nunneries, the choir is a large hall, separated from the church by a grate.

CHOISI (Francis Timoleon de), a French divine, who went to Siam in 1685 to convert the king of that country, but returned without effecting his purpose, and died in 1724, aged 81. He wrote a Journal of his Voyage to Siam; a History of France; an Ecclesiastical History; and other works.

To CHOKE. *v. a.* (aceocan, Saxon.) 1. To suffocate (*Waller*). 2. To stop up; to obstruct (*Chapman*). 3. To hinder by obstruction (*Davies*). 4. To suppress (*Shakspeare*). 5. To overpower (*Dryden*).

CHOKE. *s.* The filamentous or capillary part of an artichoke.

CHOKE DAMP, the name given by miners to a noxious air, occasionally found in the bottom of mines and pits. It is probably carbonic acid. See CARBONIC ACID.

CHOKE-PEAR. *s.* (from *choke* and *pear.*) 1. A rough, harsh, unpalatable pear. 2. Any sarcasm that stops the mouth (*Claris.*).

CHO'KER. *s.* (from *choke.*) 1. One that chokes or suffocates another. 2. One that puts another to silence. 3. Any thing that cannot be answered.

CHO'KY. *a.* (from *choke.*) That has the power of suffocation.

CHOLAGOGUES, (χολαγωγα, from χολη, bile, and αγω, to drive out). Medicines which expel redundant bile.

CHOLE, (χολη). The gall or bile.

CHOLEDOCHUS DUCTUS, (χοληδοχος; from χολη, bile, and δεχομαι, to receive, receiving or retaining the gall). Ductus communis choledochus. The common biliary duct, which conveys both cystic and hepatic bile into the intestinum duodenum.

CHO'LER. *s.* (*cholera*, Latin, from χολη.) 1. The bile (*Wotton*). 2. The humour which is supposed to produce irascibility (*Shak.*). 3. Anger; rage (*Prior*).

CHOLERA, (χολερα; from χολη, bile, and ρεω, to flow). A genus of disease arranged by Cullen in the class neuroses, and order spasmi. It consists in a purging and vomiting of bile, with anxiety, painful gripings, spasms of the abdominal muscles, and those of the thighs. There are two species of this genus: 1. Cholera spontanea, which happens, in hot seasons, without any manifest cause. 2. Cholera accidentalis, which occurs after the use of food that digests slowly, and irritates.

CHO'LERICK. *a.* (*cholericus*, Latin.) 1. Abounding with choler (*Dryden*). 2. Angry; irascible (*Arbuthnot*). 3. Offensive (*Raleigh*).

CHO'LERICKNESS. *s.* (from *cholerick.*) Anger; irascibility; peevishness.

CHOMEL (Peter John Baptist), physician to the king of France. He was born at Paris, and died in 1740. He applied with great success to botany, and wrote a History of common Plants, 3 vols. 1761. His son, John Chomel, was a doctor in physic, and died in 1765. He wrote, 1. Essai sur l'Histoire de la Médecine en France. 2. La Vie de Molin. 3. Eloge de Duret, 1765. 4. Lettre sur une Maladie de Bestiaux, 1745. &c. (*Watkins.*)

CHOMELIA. In botany, a genus of the class tetrandria, order monogynia. Calyx four-parted; corol salver-shaped, four-parted; drupe inferior, with a two-celled nut; stigmas two, thickish. One species only; an American tree with horizontal branches; leaves opposite, ovate, entire, undulate; peduncles axillary, three-flowered.

CHONDRILLA. Gum-succory. In botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle naked; calyx invested with scales; down simple, on a pedicle; florets in many rows; seeds muricate. Three species; South of Europe and Egypt.

CHONDROLOGY, (*chondrología*, χονδρολογια; from χονδρος, a cartilage, and λογος, a discourse). A discourse or treatise on cartilages.

CHONDROPTERIGIA. Chondropterigious fishes (from χαρος, a cartilage, and πτερον, a wing or gill.) In zoology, the order of fishes distinguished by cartilaginous gills. See ZOOLOGY and PISCES.

To CHOOSE. *v. a.* I *chose*, I have *chosen* or *chose*. (*choisir*, French; ceojan, Saxon.) 1. To take by way of preference of several things offered; not to reject (*Shakspeare*). 2. To take; not to refuse (*South*). 3. To select; to pick out of a number (*Job*) 4. To elect for eternal happiness.

To CHOOSE. *v. n.* To have the power of choice between different things (*Tillotson*).

CHO'OSER. *s.* (from *choose.*) He that has the power of choosing; elector (*Drayton*).

To CHOP. *v. a.* (ceapan, Saxon.) 1. To purchase, generally by way of truck; to give one thing for another (*Bacon*). 2. To put one

thing in the place of another. 3. To bandy; to altercate (*Bacon*).

To CHOP. *v. a.* (*kappen*, Dutch, *couper*, French.) 1. To cut with a quick blow (*Sh.*). 2. To devour eagerly (*Dryden*). 3. To mince; to cut into small pieces (*Locke*). 4. To break into chinks (*Shakspeare*).

To CHOP. *v. n.* 1. To do any thing with a quick motion (*Bacon*). 2. To catch with the mouth (*L'Estrange*). 3. To light or happen upon a thing suddenly.

CHOP. *s.* (from the verb.) 1. A piece chopped off (*Bacon*). 2. A small piece of meat (*King*). 3. A crack, or cleft (*Bacon*).

CHO'PHOUSE. *s.* (*chop* and *house.*) A mean house of entertainment (*Spectator*).

CHO'PIN. *s.* (French.) 1. A French liquid measure, containing nearly a pint of Winchester. 2. A term used in Scotland for a quart of wine measure.

CHO'PPING. *part. a.* An epithet frequently applied to infants, by way of commendation.

CHO'PPING-BLOCK. *s.* (*chop* and *block.*) A log of wood, on which any thing is laid to be cut in pieces (*Mortimer*).

CHO'PPING-KNIFE. *s.* A knife with which cooks mince their meat (*Sidney*).

CHO'PPY. *a.* (from *chop.*) Full of holes, clefts or cracks (*Shakspeare*).

CHOPS. *s.* (from *chaps.*) 1. The mouth of a beast (*L'Estrange*). 2. The mouth of any thing in familiar language.

CHORAGIUM, in antiquity, was used to denote the funeral of a young unmarried woman.

CHORAGUS, in antiquity, he who had the superintendence of the chorus, whose business it was to take care they observed the rules of the music, and performed their parts with decorum.

CHO'RAL. *a.* (from *chorus*, Latin.) 1. Belonging to or composing a choir or concert (*Milton*). 2. Singing in a choir (*Amhurst*).

CHORAZAN, (the ancient Bactria) the most northern province of Persia, in Asia.

CHORAZIN, in scripture geography, a town of Palestine, lying between Capernaum and Bethsaida, and about 2 miles from the former.

CHORD, or CORD, primarily denotes a slender rope or thread: being formed of *chorda*, and that from χορδη, a gut, of which strings are often made.

CHORD, in anatomy. See CHORDA.

CHORD, in geometry, a right line drawn from one part of an arch of a circle to another. Hence, chord of an arch, is a right line joining the extremes of that arch.

CHORDS, or CORDS OF MUSICAL INSTRUMENTS, are strings, by the vibration of which the sensation of sound is excited, and by the divisions of which the several degrees of tone are determined.

Chords of gold wire yield a much stronger sound than those of brass, while the sound of steel chords is much feebler.

If we strike the string of an harpsichord, or any other elastic sounding chord whatever, it returns a continuing sound. This, till of late, was considered as one simple uniform tone; but all musicians now confess, that instead of one tone it actually returns four tones, and that constantly. The notes are, besides the fundamental tone, an octave above, a twelfth above, and a seventeenth. One of the bass-notes of an harpischord has been dissected in this manner by Rameau, and the actual existence of these tones proved beyond a possibility of being controverted. See GENERATOR.

To divide a chord AB *in the most simple manner, so as to exhibit all the original concords.*

A C E D B

Divide the given line into two equal parts at C; then subdivide the part CB equally in two at D, and again the part CD into two equal parts at E. Here AC to AB is an octave; AC to AD a fifth; AD to AB a fourth; AC to AE a greater third, and AE to AD a less third; AE to EB a greater sixth, and AE to AB a less sixth Malcolm's Treatise of Music, ch. 6. sec. 3. See MONOCHORD.

To find the number of vibrations made by a musical chord or string in a given time; having given its weight, length, and tension. Let l be the length of the chord in feet, 1 its weight, or rather a small weight fixed to the middle and equal to that of the whole chord, and w the tension, or a weight by which the chord is stretched. Then shall the time of one vibration be expressed by $\frac{11}{7}\sqrt{\frac{l}{32\frac{1}{6}w}}$, and consequently the number of vibrations per second is equal to $\frac{7}{11}\sqrt{\frac{32\frac{1}{6}w.}{l}}$. (*Hutton's Exercises.*) Mr. Euler informs us, that he found the chord, making 392 vibrations in a second, to be at unison with the key called *a* in instruments, that is, an octave and sixth major above the lowest C in our harpsichords or violoncellos. Consequently the note C, being to *a* as 3 to 10, will make 118 vibrations in one second. And the highest C, or c''', being four octaves above the lowest c, will vibrate 1888 times in one second of time. Mr. Euler supposes the limits of the human ear to be, with respect to gravity, two octaves lower than C; and with respect to acuteness, two octaves higher than c'''. See INTERVAL and VIBRATION.

On the supposition that chords or strings are perfectly elastic, the following proportions have been deduced mathematically. 1. If the length of the chord and the tending force be given, the inflecting force will be nearly as the space through which the chord is bent. 2. If the length of the string and the space through which it is bent are given, the inflecting force is as the tension. 3. If the tending force, and the space through which the chord is bent, are given, the inflecting force is inversely as the length of the chord. 4. If the diameter of the chord, and the tension, are given, the times of vibration are as the length of the chord: on

which principle the monochord is founded. 5. If the tension, and length of the chord, be given, the time of vibration is as the diameter of the chord. 6. If the diameter, and length of the chord be given, the time of vibration is inversely as the square root of the tension.

CHORD, in music, the union of two or more sounds uttered at the same time, and together forming harmony. In practical music, we may notice the

Fundamental Chord, which consists of the three fundamental consonances, the 3d, the 5th, and 8th, or their inversions.

Anomalous Chord, in which some interval or intervals are greater or less than the fundamental chord.

Perfect and imperfect Chords. In the former we have the third, fifth, and octave, of the fundamental note: in the latter the sixth is substituted for the fifth. These are sometimes called direct and reversed.

To CHORD. *v. a.* To furnish with strings (*Dryden*).

CHORDA, (χορδη, from χορδυω, to roll up like a cord). In surgery. A cord. A spasmodic contraction of the penis in the venereal disease. See CHORDEE.

CHORDA TYMPANI, (*chorda*). A branch of the seventh pair of nerves that passes through the tympanum.

CHORDÆ TENDINÆ. The tendinous and cord-like substances which connect the corneæ colomnæ of the ventricles of the heart to the auricular valves.

CHORDÆ WILLISII. The small fir es which cross the sinuses of the dura mater. They are so termed, because Willis first described them.

CHORDEE, (*chorde*, French, from χορδη, a cord). A spasmodic contraction of the penis that sometimes attends gonorrhœa, and is often followed by a hæmorrhage.

CHORDOSTYLLUM. In botany, a genus of the class cryptogamia, order fungi. Fungus tenacious on a very long, tough, slightly-branched stem; head globular, somewhat deciduous, bearing the seeds. Five species of this fungus.

CHOREA SANCTI VITI, (*chorea*, χορειω; from χορος, a chorus, which of old accompanied dancing. It is called St. Vitus's dance, because some devotees of St. Vitus exercised themselves so long in dancing, that their intellects were disordered, and could only be restored by dancing again at the anniversary of St. Vitus). St. Vitus's dance. Convulsive motions of the limbs, as if the person were dancing. It is a genus of diseases arranged by Cullen in the class neuroses, and order spasmi.

CHOREPISCOPUS, an officer in the ancient church, about whose function the learned are extremely divided. The word comes from χωρος, a region or little country, and επισκοπος, a bishop or overseer. The chorepiscopi were suffragan or local bishops, holding a middle rank between bishops and presbyters.

CHOREUS, a foot in the ancient poetry, more commonly called trochæus, or trochee.

CHORIAMBUS, in the Latin poetry, a foot compounded of a choreus, or trochæus, and an iambus.

It consists of four syllables; of which the first and last are long, and the two middle ones short: as filiolum.

CHORION, (*chorion*, χοριον; from χορεω, to escape; because it always escapes from the uterus with the fetus). Shaggy chorion. The external membrane of the fetus in utero.

CHO'RISTER. *s.* (from *chorus.*) 1. A singer in cathedrals; a singing boy. 2. A singer in a concert (*Spenser*).

CHORO FAVORITO, in music, a chorus in which the best voices and instruments are employed.

CHORO RECITANTE, in music, the little chorus.

CHORO SPEZZATA, in music, a composition of two, three, or more choruses: the term is used instead of tutti, the grand chorus.

CHORO'GRAPHER. *s.* (χωρη and γραφω.) He that describes particular regions or countries.

CHOROGRA'PHICAL. *a.* Descriptive of particular regions (*Raleigh*).

CHOROGRA'PHICALLY. *ad.* In a chorographical manner.

CHORO'GRAPHY. *s.* The art or practice of describing particular regions.

CHOROID MEMBRANE, (*membrana choridea*; from χοριον, the chorion, and ειδος, resemblance). In anatomy. The second tunic of the eye, lying immediately under the sclerotica, to which it is connected by vessels. The true knowledge of this membrane is necessary to a perfect idea of the iris and uvea. The tunica choroidea commences at the optic nerve, and passes forwards, with the sclerotic coat, to the beginning of the cornea transparens, where it adheres very firmly to the sclerotic membrane, by means of a cellular membrane, in the form of a white fringe, called the ciliary circle. It then recedes from the sclerotica and cornea and ciliary circle directly downwards and inwards, forming a round disk, which is variously coloured; hence blue, black eyes, &c. This coloured portion, reflected inwards, is termed the iris, and its posterior surface is termed uvea. The choroid membrane is highly vascular, and its external vessels are disposed like stars, and termed versa vorticosa. The internal surface of this membrane is covered with a black pigment, called the pigment of the choroid membrane. See ANATOMY.

CHOROID PLEXUS. Plexus choroidea. A plexus of blood-vessels, situated in the lateral ventricles of the brain. See ANATOMY.

CHO'RUS. *s.* (*chorus*, Latin.) 1. A number of singers; a concert (*Dryden*). 2. The persons who are supposed to behold what passes in the acts of a tragedy, and sing their sentiments between the acts (*Shakspeare*). 3. The songs between the acts of a tragedy. 4. Verses of a song in which the company joins the singer.

Chorus, in dramatic poetry, is briefly described under the second and third meanings of the word. Tragedy in its origin was no more than a single chorus, who trod the stage alone, singing hymns in honour of Bacchus. Thespis, to relieve the chorus, added an actor, who rehearsed the adventures of some of their heroes; Æschylus, finding a single person too dry an entertainment, added a second. At length, however, the chorus became inserted and incorporated into the action. Sometimes it was to speak; and then their chief, whom they called coryphæus, spoke in behalf of the rest: the singing was performed by the whole company; so that when the coryphæus struck into a song, the chorus immediately joined him.

The chorus sometimes also joined the actors in the course of the representation, with their plaints and lamentations on account of any unhappy accidents that befel them: but the proper function, and that for which it seemed chiefly retained, was to show the intervals of the acts. While the actors were behind the scenes, the chorus engaged the spectators; their songs usually turned on what was exhibited, and were not to contain any thing but what was suited to the subject, and had a natural connection with it; so that the chorus concurred with the actors for advancing the action. In our modern tragedies the chorus is laid aside, and the orchesra supply its place.

Chorus, that part of a piece of music where the voices and instruments all perform together, which is commonly at the conclusion.

CHOSE. The preter tense of *choose.*

CHO'SEN. The part. pass. of *choose.*

CHOUGH. *s.* (ceo, Saxon.) A bird which frequents the rocks by the sea. See Corvus monedula.

Shakspeare mentions the chough, in his celebrated description of Dover cliff.

"The crows and choughs that wing the
midway air,
Shew scarce so gross as beetles."

CHOULE. *s.* The crop of a bird (*Brown*).

To CHOUSE. *v. a.* To cheat; to trick (*Swift*).

Chouse. *s.* 1. A bubble; a tool (*Hudibras*). 2. A trick or sham.

CHREMNITZ, the principal mine town in Upper Hungary. It belongs to the house of Austria. Lat. 48. 59 N. Lon. 19. 27 E.

CHRENECRUDA, a term occurring in writers of the middle age, and expressing a custom of those times, but its signification is doubtful. It is mentioned in Lege Salica, Tit. 61. which says, he who kills a man, and hath not wherewithal to satisfy the law, or pay the fine, makes oath that he has delivered up every thing he was possessed of; the truth of which must be confirmed by the oaths of twelve other persons. Then he invites his next relations by the father's side to pay off the remainder of the fine, having first made over to them all his effects by the following ceremony. He goes into his house, and taking in his hand a small quantity of dust from each of the four corners, he returns to the door, and with his face inwards throws the dust with his left hand over his shoulders upon his nearest of kin. Which done, he strips to his shirt; and coming out with a pole in his hand, jumps over the hedge. His relations, whether one or several, are upon this obliged to pay off the composition for the murder. And if these (or any one of them) are not able to pay, iterum super illum chrenecruda qui pauperior est, jactat, et ille totam legem componat.

CHRISM, (from χριω, I anoint). Oil consecrated by the bishop, and used in the Romish and Greek churches, in the administration of baptism, confirmation, ordination, and extreme unction, which is prepared on Holy Thursday with much ceremony. In Spain it was anciently the custom for the bishop to take one third of a sol for the chrism distributed to each church, on account of the balsam that entered its composition.

Du-Cange observes, there are two kinds of chrism; the one prepared of oil and balsam, used in baptism, confirmation, and ordination; the other of oil alone, consecrated by the bishop, used anciently for the catechumens, and still in extreme unction.

CHRISOM, Chrismale, was anciently the face-cloth or piece of linen laid over the child's head when it was baptised. Whence, in our bills of mortality, children who die in the month are called chrisoms. The time between the child's birth and baptism was also called chrisomus.

CHRIST, an appellation synonymous with Messiah, usually added to Jesus; and, together therewith, denominating the Saviour of the world. (See Christianity and Messiah.) The word χριςὸς signifies anointed, from χριω, *inungo*, I anoint. Sometimes the word Christ is used singly, by way of antonomasis, to denote a person sent from God, as an anointed prophet, king, or priest.

Christ (Order of), a military order, founded by Dionysius I. king of Portugal, to animate his nobles against the Moors. The arms of this order are gules, a patriarchal cross, charged with another of cross argent: they had their residence at first at Castromarin; afterwards they removed to the city of Thomar, as being nearer to the Moors of Andalusia and Estremadura.

Christ is also the name of a military order in Livonia, instituted in 1205 by Albert bishop of Riga. The end of this institution was to defend the new Christians, who were converted every day in Livonia, but were persecuted by the Heathens. They wore on their cloaks a sword with a cross over it, whence they were also denominated brothers of the sword.

Christ Church, formerly called Twinham Bourn, a town of Hampshire, with a market on Mondays. It sends two members to parliament, Lat. 50. 45 N. Lon. 1. 46 W.

To CHRI'STEN. *v. a.* (cpırtnıan, Sax.) 1. To baptise; to initiate into christianity by water. 2. To name; to denominate (*Burnet*).

CHRI'STENDOM. *s.* (from *Christ* and *dom.*) The collective body of christianity (*Hooker*).

CHRI'STENING. *s.* (from *christen.*) The ceremony of the first initiation into christianity (*Bacon*).

CHRI'STIAN. *s.* (*christianus*, Lat.) A professor of the religion of Christ (*Tillotson*).

CHRI'STIAN. *a.* Professing the religion of Christ (*Shakspeare*).

CHRI'STIAN-NAME. *s.* The name given at the font, distinct from the gentilitious name or surname.

CHRISTIAN KING (Most), one of the titles by which the kings of France were distinguished. The French antiquaries trace the origin of this appellation up to Gregory the Great, who, writing a letter to Charles Martel, occasionally gave him that title, which his successors afterwards retained.

CHRISTIAN RELIGION, or CHRISTIANITY, that instituted by Jesus Christ, comprehending doctrines of faith, and rules of practice, all of which are contained in the New Testament, and are designed to recover mankind from ignorance and vice, from guilt and death, to true knowledge and virtue, to the divine favour, and everlasting life. Its aptitude to this end, its conformity to reason, and to the state of man, the sublimity and excellence of its doctrines, the equally venerable and lovely character of its author, the purity of its precepts, its benign tendency and salutary effects, concur, with the external evidence of prophecy and miracles, to establish its divine origin and truth. The name Christian was first given at Antioch, in the year 42, to such as believed in Christ, as we read in the Acts: till that time they were called disciples. Hence the system itself is called christianity. The foundation of a Christian's faith and practice, his ultimate, and, in truth, his only appeal, must be to the facts, the doctrines, and the precepts of the scriptures, particularly those of the New Testament. Other formularies, other confessions of faith, from whatever motives dictated, and from whatever reasons recommended, should ever be regarded with a suspicious eye; lest, by laying stress upon what is human, we should overlook that which comes recommended upon divine authority. The careful reader of the New Testament will find a detail of instructions given, of wonders performed, and of future events revealed. He will also be struck with a very particular account of the sufferings, death, resurrection, and ascension of Jesus the founder. The history containing these things appears to be fairly written, and to carry with it as substantial proofs of its authenticity as any history that has gained credit in the world. Is the Christian called upon for the reason why he believes in the antiquity of the writings of the New Testament? he may reply, "For the same reason that I believe the antiquity of Virgil's Poems, Cæsar's Commentaries, or Sallust's Narrations: and that is, the concurring testimony of all intervening ages. Do any ask, Why I believe that the several books were written by the persons whose names they bear? I answer, For the same reason that I believe the Georgics to be the production of Virgil; Jerusalem Delivered that of Tasso; Paradise Lost, that of Milton; an Essay upon the Subject of Miracles, to be the work of Hume; and a Refutation of that Essay, the performance of Campbell. Do any inquire, Whether the sacred pages have not been greatly corrupted? I answer, They have not been greatly corrupted; as appears by a collation of the earliest manuscripts, and an appeal to the earliest versions and ancient fathers. So many corroborating circumstances plead in favour of the Gospel, that I must either disturb all records, or continue to admit the authenticity of those which display the duty and hopes of a Christian."

In reasoning upon the truth of Christianity we may appeal to its internal evidence, and combining the doctrine and precepts of the system, infer from them the validity of the system itself. The early triumphs of this religion furnish another powerful argument in its support: especially if it be remembered that in the estimation of the world it was neither honourable, profitable, nor popular. Under every disadvantage, and struggling under the most terrible persecution, it flourished, and has maintained its ground for nearly two thousand years. Another argument for the truth of the Christian religion arises from the completion of prophecies, of which some preceded Jesus, and were accomplished in him, and others were uttered by him, and came to pass during his life; such were the treachery of Judas, and the cowardice and meanness of Peter: or within a few years after his crucifixion; of this kind was the memorable destruction of Jerusalem. The character of Christ, and the miracles which he wrought, are evidences of the divinity of his mission. On these grounds if the question be put "Why are you a Christian?" the answer has been given by a good writer, from whom we shall transcribe it. "Not because I was born in a Christian country, and educated in Christian principles; not because I find the illustrious Bacon, Boyle, Locke, Clarke, and Newton, among the professors and defenders of Christianity; nor merely because the system itself is so admirably calculated to mend and exalt human nature; but because the evidence accompanying the Gospel has convinced me of its truth. The secondary causes, assigned by unbelievers, do not, in my judgment, account for the rise, progress, and early triumphs of the Christian religion. Upon the principles of scepticism, I perceive an effect without an adequate cause. I therefore stand acquitted to my own reason, though I continue to believe and profess the religion of Jesus Christ. Arguing from effects to causes, I think I have philosophy on my side. And reduced to a choice of difficulties, I encounter not so many in admitting the miracles ascribed to the Saviour, as in the arbitrary suppositions and conjectures of his enemies.

"That there once existed such a person as Jesus Christ; that he appeared in Judea in the reign of Tiberius; that he taught a system of morals superior to any inculcated in the Jewish schools; that he was crucified at Jerusalem; and that Pontius Pilate was the Roman governor by whose sentence he was condemned and executed, are facts which no one can reasonably call in question. The most inveterate Deists admit them without difficulty: and, indeed, to dispute these facts would be giving the lie to all history. As well might we deny the existence of Cicero, as that of a person by the name of Jesus Christ. And with equal propriety might we call in question the orations of

the former, as the discourses of the latter. We are morally certain that the one entertained the Romans with his eloquence, and that the other enlightened the Jews with his wisdom. But it is unnecessary to labour these points, because they are generally conceded. They who affect to despise the evangelists and apostles profess to reverence Tacitus, Suetonius, and Pliny. And these eminent Romans bear testimony to several particulars which relate to the person of Jesus Christ, his influence as the founder of a sect, and his crucifixion. From a deference to human authority, all therefore acknowledge that the Christian religion derived its name from Jesus Christ. And many among the Deists are so just to its merits, as to admit that he taught better than Confucius, and practised better than Socrates or Plato.

"To come then to the question: Why are you a Christian? I answer, Because the Christian religion carries with it internal marks of its truth; because not only without the aid, but in opposition to the civil authority, in opposition to the wit, the argument, and violence of its enemies, it made its way, and gained an establishment in the world; because it exhibits the accomplishment of some prophecies, and presents others which have been since fulfilled; and because its author displayed an example, and performed works, which bespeak not merely a superior, but a divine, character. Upon these several facts I ground my belief as a Christian: and till the evidence on which they rest can be invalidated by counter evidence, I must retain my principles and my profession." See farther in continuance of this train of argumentation an admirable little pamphlet, entitled, "An Answer to the Question, Why are you a Christian?" by Dr. John Clarke, of Boston, America; published in England by Dr. Toulmin of Taunton in 1797, and sold by Johnson, St. Paul's Church-yard.

The late Soame Jenyns, in his View of the Internal Evidence of the Christian Religion, undertakes to shew that from the New Testament may be collected not only doctrines of religion, but also a system of ethics, in which every moral precept founded on reason is carried to a higher degree of purity and perfection than ever before, —that every moral precept founded on false principles is totally omitted,—and many new precepts added peculiarly corresponding with the new object of this religion,—that such a system of religion and morality could not possibly have been the work of any man, or set of men, and that therefore it must undoubtedly have been effected by the interposition of Divine Power. This work, though not in all respects free from objection, abounds with valuable remarks; among which we think the following deserve the attention of the reader.

1. In all former religions, the good of the present life was proposed as the first object; in the Christian it is but the second: in those, men were incited to promote that good by the hopes of a future reward; in this, the practice of virtue is enjoined in order to qualify them for that reward. Hence it is that Christianity insists more strongly than any preceding institution, religious or moral, on purity of heart, and a benevolent disposition, because these are absolutely necessary to its great end.

2. The personal character of the author of this religion is no less new and extraordinary than the religion itself. For instance, he is the only founder of a religion in the history of mankind, which is totally unconnected with all human policy and government, and therefore totally unconducive to any worldly purpose whatever. All other, Mahomet, Numa, and even Moses himself, blended their religious institutions with their civil, and by them obtained dominion over their respective people; but Christ neither aimed at, nor would accept of any such power; he rejected every object, which all other men pursue, and made choice of all those which others fly from, and are afraid of. No other ever made his own sufferings and death a requisite part of his original plan, essential to his mission, and necessary to the salvation of his followers.

3. Before the appearance of Christianity there existed nothing like religion on the face of the earth, the Jewish only excepted: all other nations were immersed in the grossest idolatry, which had little or no connection with morality, except to corrupt it by the infamous examples of their imaginary deities. They all worshipped a multiplicity of gods and demons, whose favour they courted by impious, obscene and ridiculous ceremonies, and whose anger they endeavoured to appease by the most abominable cruelties. In the politest ages of the politest nations in the world, at a time when Greece and Rome had carried the arts of oratory, poetry, history, architecture and sculpture to the highest perfection, and made no inconsiderable advances in those of mathematics, natural and even moral philosophy, in religious knowledge they had made none at all; a strong presumption that the noblest efforts of the mind of man, unassisted by revelation, were unequal to the task. They sometimes talked of virtue carrying men to heaven and placing them amongst the gods; but by this virtue they meant only the invention of arts, or feats of arms: for with them heaven was open only to legislators and conquerors, the civilizers or destroyers of mankind. This was, then, the summit of religion in the most polished nations in the world, and even this was confined to a few philosophers, prodigies of genius and literature, who were little attended to and less understood by the generality of mankind in their own countries; whilst all the rest were involved in one common cloud of ignorance and superstition. At this time Christianity broke forth from the east like a rising sun, and dispelled this universal darkness.

4. Christianity has taught doctrines as inconceivable to the wisest of mankind antecedent to its appearance, as the Newtonian system is at this day to the most ignorant tribes of savages in the wilds of America; doctrines, which human reason never could have discovered, but which, when discovered, coincide with and are confirmed by it; and which, though beyond the reach of all the learning and penetration of Plato, Aristotle and Cicero, are now clearly laid open to the eye of every peasant and mechanic with the Bible in his hand. These are all plain facts too glaring to be contradicted, and therefore, whatever we may think of the authority of these books, the relations they contain, or the inspiration of their authors, of these facts, no man who has eyes to read, or ears to hear, can entertain a doubt; because there are the books, and in them is this religion.

5. Christianity enjoins, with peculiar plainness and authority, piety to God, benevolence to men, justice, charity, temperance and sobriety; with all those duties which prohibit the commission of the contrary vices, all which debase our natures, and,

by mutual injuries, introduce universal disorder, and, consequently, universal misery. But it entirely omits precepts founded on false principles, those which recommend fictitious virtues, which, however celebrated and admired, are productive of no salutary effects, and, in fact, are no virtues at all. Valour, for instance, is for the most part constitutional; and so far is it from producing any salutary effects by introducing peace, order or happiness into society, that it is the usual perpetrator of all the violences, which from retaliated injuries distract the world with bloodshed and devastation. It is the engine by which the strong are enabled to plunder the weak, the proud to trample upon the humble, and the guilty to oppress the innocent. It is the chief instrument which ambition employs in her unjust pursuits of wealth and power, and is therefore so much extolled by her votaries. It was indeed congenial with the religion of pagans, whose gods were, for the most part, made out of deceased heroes exalted to heaven as a reward for the mischiefs which they had perpetrated upon earth; and therefore with them this was the first of virtues, and had even engrossed that denomination to itself. But Christians are so far from being allowed to inflict evil, that they are forbid even to resist it; they are so far from being encouraged to revenge injuries, that one of their first duties is to forgive them; so far from being incited to destroy their enemies, that they are commanded to love them, and to serve them to the utmost of their power. If christian nations therefore were nations of Christians, all war would be impossible and unknown amongst them.

6. Patriotism also, that celebrated virtue so much practised in ancient, and so much professed in modern, times, that virtue, which so long preserved the liberties of Greece, and exalted Rome to the empire of the world, must also be excluded; because it not only falls short of, but directly counteracts the extensive benevolence of this religion. Christianity commands us to love all mankind, patriotism to oppress all other countries in order to advance the imaginary prosperity of our own. Christianity enjoins us to imitate the universal benevolence of our Creator, who pours forth his blessings on every nation upon earth; patriotism to copy the mean partiality of a parish officer, who thinks injustice and cruelty meritorious, whenever they promote the interests of his own inconsiderable village. This has ever been a favourite virtue with mankind, because it conceals self-interest under the mask of public spirit, not only from others, but even from themselves; and gives a licence to inflict wrongs and injuries not only with impunity, but with applause; but it is so diametrically opposite to the great characteristic of this institution, that it never could have been admitted into the list of Christian virtues.

7. Of those new precepts in this religion peculiarly corresponding with the new object of it, that is, preparing us for the kingdom of heaven, the chief are poorness of spirit, forgiveness of injuries, and charity to all men; to these we may add repentance, faith, self-abasement, and a detachment from the world, all moral duties peculiar to this religion, and absolutely necessary to the attainment of its end. By poorness of spirit is to be understood a disposition of mind, meek, humble, submissive to power, void of ambition, patient of injuries, and free from all resentment. This was so new, and so opposite to the ideas of all pagan moralists, that they thought this temper of mind a criminal and contemptible meanness, which must induce men to sacrifice the glory of their country, and their own honour, to a shameful pusillanimity; and such it appears to almost all who are called Christians even at this day, who not only reject it in practice, but disavow it in principle, notwithstanding this explicit declaration of their master. We see them revenging the smallest affronts by premeditated murder, as individuals, on principles of honour; and, in their national capacities, destroying each other with fire and sword for the low considerations of commercial interests, the balance of rival powers, or the ambition of princes: we see them with their last breath animating each other to a savage revenge, and, in the agonies of death, plunging with feeble arms their daggers into the hearts of their opponents; and, what is still worse, we hear all these barbarisms celebrated by historians, flattered by poets, applauded in theatres, approved in senates, and even sanctified in pulpits. But universal practice cannot alter the nature of things, nor universal error change the nature of truth.

8. Another precept, equally new, and no less excellent, is forgiveness of injuries. The wisest moralists of the wisest nations and ages represented the desire of revenge as a mark of a noble mind, and the accomplishment of it as one of the chief felicities attendant on a fortunate man. But how much more magnanimous, how much more beneficial to mankind is forgiveness! It is more magnanimous, because every generous and exalted disposition of the human mind is requisite to the practice of it: for these alone can enable us to bear the wrongs and insults of wickedness and folly with patience, and to look down on the perpetrators of them with pity, rather than with indignation; these alone can teach us, that such are but a part of those sufferings allotted to us in this state of probation, and to know, that to overcome evil with good is the most glorious of all victories. It is the most beneficial, because this amiable conduct alone can put an end to an eternal succession of injuries and retaliations; for every retaliation becomes a new injury, and requires another act of revenge for satisfaction. But would we observe this salutary precept, to love our enemies, and to do good to those who despitefully use us, this obstinate benevolence would at last conquer the most inveterate hearts, and we should have no enemies to forgive. This noble and useful virtue is an obvious remedy for most of the miseries of this life, and a necessary qualification for the happiness of another.

9. Detachment from the world is another moral virtue constituted by this religion alone: so new, that even at this day few of its professors can be persuaded that it is required, or that it is any virtue at all. But such an unremitted anxiety and perpetual application as engrosses our whole time and thoughts are forbid, because they are incompatible with the spirit of this religion, and must utterly disqualify us for the attainment of its great end. The Christian system forbids all extraordinary efforts to obtain wealth, care to secure, or thought concerning the enjoyment of it. "Lay not up for yourselves treasures on earth." The chief object of the pagans was immortal fame; for this their poets sang, their heroes fought, and their patriots died; and this was hung out by their philosophers and legislators, as the great incitement to all noble and virtuous deeds. But what saith the Christian legislator to his disciples on

this subject? "Blessed are ye when men shall revile you, and shall say all manner of evil against you for my sake; rejoice and be exceeding glad, for great is your reward in heaven." Nothing has so much contributed to corrupt the true spirit of the Christian institution, as that partiality, which we contract, from our earliest education, for the manners of pagan antiquity; from whence we learn to adopt every moral idea which is repugnant to it; to applaud false virtue, which that disavows; to be guided by laws of honour, which that abhors; to imitate characters, which that detests; and to behold heroes, patriots, conquerors, and suicides with admiration, whose conduct that utterly condemns. From a coalition of these opposite principles was generated that monstrous system of cruelty and benevolence, of barbarism and civility, of rapine and justice, of fighting and devotion, of revenge and generosity, which harassed the world for several centuries with crusades, holy wars, knight-errantry, and single combats, and even still retains influence enough, under the name of honour, to defeat the most beneficent ends of this holy institution. A man whose ruling principle is honour, in the common acceptation, however virtuous, in a sense, he may be, cannot be a Christian, because he erects a standard of duty, and deliberately adheres to it, diametrically opposite to the whole tenor of that religion.

10. Every one of these propositions is incontrovertibly true; and if true, this short but certain conclusion must inevitably follow. That such a system of religion and morality could not possibly be the work of any man, or set of men, much less of those obscure, ignorant and illiterate persons who actually did discover and publish it to the world; and that therefore it must have been effected by the supernatural interposition of divine power and wisdom; that is, that it must derive its origin from God. If any one can believe that these men could become impostors, for no other purpose than the propagation of truth, villains for no end but to teach honesty, and martyrs without the least prospect of honour or advantage; or that, if all this should have been possible, these few inconsiderable persons should have been able, in the course of a few years, to spread this their religion over most parts of the then known world, in opposition to the interests, pleasures, ambition, prejudices, and even reason of mankind; to have triumphed over the power of princes, their intrigues, the force of custom, the blindness of zeal, the influence of priests, the arguments of orators, and the philosophy of all the world, without any supernatural assistance; if any one can believe all these miraculous events, contradictory to the constant experience of the powers and dispositions of human nature, he must be possessed of much more faith than is necessary to make him a declared Christian, and remain an unbeliever from mere credulity.

"Whence but from heaven, should men unskill'd in arts,
In different nations born, in different parts,
Weave such agreeing truths? or how? or why?
Should all conspire to cheat us with a lie?
Unask'd their pains, ungrateful their advice,
Starving their gains, and martyrdom their price."

DRYDEN.

On this most momentous of all subjects we beg to recommend to the notice of the reader, besides the two pieces quoted above, Owen's Div. Orig. Script.; Reynolds's Letters to a Deist; Addison on the Evidences of Christianity; Leslie's Short Way with the Deists; Doddridge's Lectures on Divinity, parts 6 and 10; Doddridge's three Sermons on the Evidences of Christianity, recommended by the present venerable Bishop of London; Delany's Revelation examined with Candour; Hartley's Observations on Man, part ii. chap. 2.; Paley's Evidences of Christianity, and Joyce's Analysis of that work; Watson's Apology for Christianity, in reply to Gibbon, and his Apology for the Bible, in reply to Paine; in both which latter works we admire almost every thing, except the titles.

CHRISTIANS OF ST. JOHN, a sect of Christians very numerous in Balsara and the neighbouring towns: they formerly inhabited along the river Jordan, where St. John baptised, and it was from thence they had their name. They hold an anniversary feast of five days; during which they all go to the bishop, who baptises them with the baptism of St. John. Their baptism is also performed in rivers, and that only on Sundays: they have no notion of the third person in the Trinity; nor have they any canonical book, but a number full of charms, &c. Their bishoprics descend by inheritance, as our estates do, though they have the ceremony of an election.

CHRISTIANS OF ST. THOMAS, a sort of Christians in a peninsula of India on the side of the Gulph; they inhabit chiefly at Cranganor, and the neighbouring country: these admit of no images; and receive only the cross, to which they pay a great veneration: they affirm, that the souls of the saints do not see God till after the day of judgment; they acknowledge but three sacraments, viz. baptism, orders, and the eucharist: they make no use of holy oils in the administration of baptism; but, after the ceremony, anoint the infant with an unction composed of oil and walnuts, without any benediction. In the eucharist, they consecrate with little cakes made of oil and salt, and instead of wine make use of water in which raisins have been infused.

CHRISTIANA, a city of Southern Norway, in the government of Aggerhuys, situated at the extremity of a fertile valley, forming a semicircular bend along the shore of the beautiful bay of Biorning, which forms the N. extremity of the gulf of Christiana. It is divided into the city, and the suburbs of Waterlandt, Peterwigen, and Fierdingen: the fortress of Aggerhuys; and the old town of Opsloe in Ansloe. The city contains 418 houses, the suburbs 682, Opsloe 400, and the inhabitants amount to about 9000. The city is well built, has an excellent harbour, and carries on a considerable trade. Lat. 58. 59 N. Lon. 10. 15 E.

CHRISTIANBURG, a fortress on the Gold Coast of Guinea, in Africa, belonging to the Danes. Lat. 4. 10 N. Lon. 1. 55 E.

CHRISTIANOPLE, a seaport town on the Baltic, belonging to Sweden, 13 miles N. E. of Carlescroon. Lat. 56. 26 N. Lon. 15. 47 W.

CHRI'STIANISM. *s.* (*christianismus*, Lat.)

1. The christian religion. 2. The nations professing christianity.

CHRISTIA'NITY. *s.* (*chretienté*, French.) The religion of christians (*Addison*).

To CHRI'STIANIZE. *v. a.* (from *christian.*) To make christian (*Dryden.*)

CHRI'STIANLY. *ad.* (from *christian.*) Like a christian.

CHRISTIANSTADT, a town of South Gothland, in Sweden, 50 miles N. E. of Copenhagen. Lat. 56. 25 N. Lon. 14. 10 E.

CHRISTMAS, a festival of the Christian church, observed on the 25th of December, in memory of the nativity of Jesus Christ. Whether it was always observed on the 25th of December is a matter of doubt. Dr. Cave is of opinion that it was first kept by the eastern church in January, and confounded with the Epiphany, till, receiving better information from the western churches, they changed it to that day. St. Chrysostom affirms, that it was not above ten years since Christmas began to be celebrated in the church of Antioch upon that day: Clemens Alexandrinus reckons, from the birth of Christ to the death of Commodus, exactly one hundred and ninety-four years, one month, and thirteen days; which time, being taken according to the Egyptian account, and reduced to the Julian or Gregorian stile, makes the birth of Christ fall on the 25th or 26th of December; yet, notwithstanding this, the same father tells us, that there were some who more curiously searching after the year and day of Christ's nativity, affixed the latter to the 25th of the month Pachon. Now in that year in which Christ was born, the month Pachon commenced the 20th of April; so that according to this computation, Christ was born on the 16th of May. Others again say, the general assessments were always in autumn, and that this was the time when "Shepherds watched their flocks by night;" and thence they infer that the nativity was either in September or October. Hence we may see how little certainty there is in this matter, since so soon after the event the learned were divided in opinion concerning it. As to the antiquity of this festival, the first footsteps we find of it were in the second century, about the time of the emperor Commodus.

CHRISTMAS ISLE, so called by captain Cook, because he landed here on Christmas-day. It is of a simicircular form, having the appearance of the moon in her last quarter, the two horns being the north and south points, and the west side being indented by a large lagoon. It is about 60 miles in circumference, and is bounded by a reef of coral rocks, on the west side of which there is a bank of fine sand, extending about a mile into the sea, and affording a good anchorage. Lat. 1. 59 N. Lon. 157. 30 W.

CHRISTMAS ISLE, a small island of the Indian Ocean. Lat. 10. 20 S. Lon. 102. 50 E.

CHRISTMAS ROSE, in botany. See HELLEBORUS.

CHRI'STMAS-BOX. *s.* A box in which little presents are collected at Christmas (*Gay*).

The present itself is, also, usually called a Christmas-box.

CHRISTOPHER'S (St.), commonly called St. Kitt's, one of the Caribbee Islands, in America. It is 20 miles long, and 7 or 8 broad; and produces a greater quantity of sugar than any of the islands, except Jamaica and Barbadoes. In some years, indeed, it produces full as much as the latter. It yields also cotton, ginger, and the tropical fruits. Christopher Columbus, in the service of Spain, discovered this island in 1493, and gave it his christian name. The Spaniards afterwards deserted it, and the English and French divided it between them in the year 1625. A mountain runs through the middle of it, from which issue several rivulets. The French were possessed of the south side of the island till the peace of Utrecht, 1713, when they yielded it to Great Britain. It is said to contain 6000 whites, and 36,000 negroes. Lat. 17. 15 N. Lon. 63. 14 W.

CHRISTOPHER'S HERB. See ACTŒA.

CHRIST'S THORN. See RHAMNUS.

CHROMA, in rhetoric, a colour or fair pretence.

CHROMA, in music, a quaver.

CHROMAT OF LEAD. See CHROMIUM.

CHROMAT OF IRON. See CHROMIUM.

CHROMATIC, the second of the ancient musical genera, tending to express grief. It is derived from χρωμα, which perhaps may not only signify a colour, but that shade of a colour by which it melts into another. Hence its application to semitones is manifest; and semitones are the characteristics of the chromatic music. The ancient sorts of chromatic are as follow:

The chromaticum molle was a division of the diatessaron into three intervals, which were two subsequent semitones minor, and the interval, which is the complement of these two to the fourth; and this interval will be found equal to a third minor added to an enharmonic diesis. This species is not to be met with among the moderns.

The chromaticum sesquialterum, or hemiolium, was a division of the fourth into a semitone major, a semitone minor, and a third minor. It occurs in modern compositions.

The chromaticum tonicum, or tonicum, was a division of the fourth into a semitone major succeeded by another semitone major, and the compliment of these two to the fourth, which is the interval, commonly called a superfluous tone. This often occurs in modern music.

The chromatic species is admirably fitted to express grief and affliction; these sounds boldly struck in ascending tear the soul. Their power is no less magical in descending; it is then that the ear seems to be pierced with real groans. Attended with its proper harmony, this species appears proper to express every thing; but its completion, by concealing the melody, sacrifices a part of its expression; and for this disadvantage, arising from the fulness of the harmony, it can only be compensated

by the nature and genius of the movement. We may add, that in proportion to the energy of this species, the composer ought to use it with greater caution and parsimony. Like those delicate viands, which, when profusely administered, immediately surfeit us with their abundance; as much as they delight us when enjoyed with temperance, so much do they disgust when devoured with prodigality.

CHROMATICS, in philosophy, (from χρωμα, colour.) That branch of the science of optics, which states and explains the properties of the colours of light, and of natural bodies. See COLOURS.

CHROMATS, salts formed by the union of chromic acid with different bases. The alkaline chromats have beautiful orange-coloured crystals, and are soluble in water; while the earthy chromats are nearly insoluble in that fluid. The other properties of these salts are very little known. The native chromats will be noticed under CHROMIUM.

CHROMIC ACID was discovered by Vauquelin, who obtained it from the red lead ore of Siberia: this acid is in the form of an orange-coloured powder, having an acrid metallic taste, soluble in water, and crystallizable. It is composed of about 33 parts of chromium, to 67 of oxygen. When mixed with different saline solutions, it assumes a variety of beautiful colours: when heated on charcoal before the blow-pipe, part of its oxygen is separated, and the acid is reduced to the form of an oxyd. It is also partially decomposed by the muriatic acid, ether, alcohol, and even by exposure to light. It is completely reduced to a metallic state, by heating in contact with charcoal. With the earths and alkalies, it forms the salts called chromats. Vauquelin, who discovered it, obtained it from the red lead of Siberia.

CHROMIUM, CHROME. In oryctology, a genus of the class metals. White, with a shade of yellow, very brittle; very difficult of fusion; gradually oxydating in the nitric acid, the oxyd becoming green when heated in a close vessel. Two species.

1. C. plumbi. Chromat of lead; red lead ore or spar. Found in the gold mines of Beresof, near Ekaterinbourg in Siberia. Specific gravity from 5.750 to 6.029. Contains

Oxyd of lead	65.12
Chromic acid	34.88
	10.0.00

2. C. ferri. Chromat of iron. Brown, with an ashy grey powder, and a light metallic lustre, melted with potash and dissolved in water imparting an orange-yellow colour to the solution. Found near Gassin in France, and in Siberia, in irregular masses: hardness sufficient to scratch glass; insoluble in nitric acid; melts with borax in a fine green glass. Specific gravity 4,032: contains

Chromic acid	43,0
Oxyd of iron	34,7
Alumine	20,3
Silica	2,0
	100,0

Chrome, in the state of acid, appears to be more susceptible of combination, and this acid being obtained without difficulty from its native combinations, its chemical relations have been more examined. Chromic acid is very soluble in water; the taste of the solution is sharp and metallic; it is of an orange-red colour; by evaporation, either spontaneous, or with a gentle heat, it affords crystals in long slender prisms, of a ruby-red colour. This acid combines with the alkalies, earths, and metallic oxyds, forming neutral salts which are named chromats.

The combinations of this acid with metallic oxyds are in general possessed of very beautiful colours, and are well adapted to form the finest paints. That with oxyd of lead has an orange yellow, of various shade; that with mercury, a vermilion red; with silver, a carmine red; with zinc and bismuth, the colours are yellow; with copper, cobalt, and antimony, they are dull.

CHRO'NICAL. CHRO'NICK. *a.* (from χρονος, time.) A *chronical* distemper is of length, opposed to *acute* (*Brown*).

CHRO'NICLE. *s.* (*chronique*, French.) 1. A register of events in order of time (*Shakspeare*). 2. A history (*Dryden*).

To CHRO'NICLE. *v. a.* (from the noun.) 1. To record in chronicle, or history (*Spenser*). 2. To register; to record (*Congreve*).

CHRO'NICLER. *s.* (from *chronicle.*) 1. A writer of chronicles (*Donne*). 2. A historian (*Raleigh*).

CHRONICLES, in the canon of Scripture, are two sacred books called by the Greeks Paralipomena, Παραλειπομενα, because they contain many supplemental relations omitted in the other historical books. They are an abridgment of sacred history, to the return of the Jews from the Babylonish captivity. The first book traces the genealogies of the Israelites from Adam, relates the death of Saul, and gives a brief account of David's reign. The second traces the progress of the kingdom of Judah, its various revolutions, its period under Zedekiah, and the restoration of the Jews by Cyrus. The Jews made but one book of the Chronicles, under the title of Dibre-Haiamim, i. e. Journals or Annals. Ezra is generally believed to be the author of these books. It is certain they were written after the end of the Babylonish captivity and the first year of the reign of Cyrus, of whom mention is made in the last chapter of the second book.

CHRO'NOGRAM. *s.* (χρονος and γραφω.) An inscription including the date of any action (*Howel*).

CHRONOGRAMMA'TICAL. *a.* Belonging to a chronogram.

CHRONOGRA'MMATIST. *s.* A writer of chronograms (*Addison*).

CHRONO'LOGER. *s.* (χρονος, time, and λογος, doctrine.) He that studies or explains the science of computing past time (*Holder*).

CHRONOLO'GICAL. *a.* (from *chronology.*) Relating to the doctrine of time (*Hale*).

CHRONOLO'GICALLY. *ad.* (from *chro-*

nological.) In a chronological manner; according to the exact series of time.

CHRONO'LOGIST. *s*. One that studies or explains time; a chronologer (*Locke*).

CHRONOLOGY, treats of time, and, as an art, shews the method of measuring its parts, and adapting these, when distinguished by proper marks and characters to past transactions, for the illustration of history. It therefore consists of two parts: the first treats of the proper measurement of time, and the adjustment of its several divisions; the second, of fixing the dates of the various events recorded in history, and ranging them according to the several divisions of time, in the order in which they happened.

Chronology, comparatively speaking, is but of modern date. The ancient poets appear to have been entirely unacquainted with it; and Homer, the most celebrated of them all, mentions nothing like a formal calendar in any part of his writings. In the most early periods, the only measurement of time was by the seasons, the revolutions of the sun and moon: and many ages must have elapsed before the mode of computation by dating events came into general use. Several centuries intervened between the era of the olympic games and the first historians; and several more between these and the first authors of chronology. When time first began to be reckoned, we find its measures very indeterminate; and this circumstance renders the historians of the early periods remarkably uncertain. Even after the invention of dates and eras, we find the ancient historians very inattentive to them, and inaccurate in their computations. Frequently their eras and years were reckoned differently without their being sensible of it, or at least without giving the reader any information concerning it; a circumstance which has rendered the fragments of their works now remaining of very little use to posterity. The Chaldean and Egyptian writers are generally acknowledged to be fabulous; and Strabo acquaints us, that Diodorus Siculus, and the other early historians of Greece, were ill informed and credulous. Hence the disagreement among the ancient historians, and the extreme confusion and contradiction we meet with on comparing their works.

From these observations it is obvious how necessary a proper system of chronology must be for the right understanding of history, and likewise how very difficult it must be to establish such a system. In this, however, several learned men have excelled, and their systems have been founded: 1. On astronomical observations, particularly of the eclipses of the sun and moon, combined with the calculations of the eras and years of different nations. 2. The testimonies of credible authors. 3. Those epochs in history which are so well attested and determined, that they have never been controverted. 4. Ancient medals, coins, monuments, and inscriptions.

The most obvious division of time is derived from the apparent or real revolutions of the sun and moon. Thus the apparent revolution of the sun, or the real rotation of the earth on her axis, constituting the vicissitudes of day and night, must be evident to the most barbarous and ignorant nations. The moon by her motion and changes, as naturally and obviously forms months: while the great course of the sun through the zodiac points out the larger division of the year. This latter period, however, was not soon accurately ascertained: for, to go no farther back, we find that in the calendar of Romulus, the year was made to consist of only 304 days; in that of Numa Pompilius of 355 days; and it was first ascertained with any tolerable accuracy, at Rome, in the time of Julius Cæsar.

The day is divided into hours, minutes, &c. the months into weeks, and the year into months, having particular names, and a certain number of days. See a particular account of each of these under the respective words.

It is remarkable, that one day in the week has always been held sacred by every nation. Thus, Saturday was consecrated to pious purposes among the Jews, Friday by the Turks, Tuesday by the Africans of Guinea, and Sunday by the Christians. Hence also the origin of feriæ or holidays, frequently made use of in systems of chronology; and which rose from the following circumstance. In the church of Rome the old ecclesiastical year began with Easter-week; all the days of which were called feriæ or feriati, that is, holy, or sacred days; and in process of time the days of the other weeks came to be distinguished by the same appellation, for the two following reasons: 1. Because every day ought to be holy in the estimation of a Christian. 2. Because all days are holy to ecclesiastics, whose time ought to be entirely devoted to religious purposes.—The term *week* is sometimes used to signify seven years, not only in the prophetical writings, but likewise by profane authors; thus Varro, in his book inscribed Hebdomades, informs us, that he had then entered the 12th week of his years.

Besides the natural divisions of time arising from the revolutions of the heavenly bodies, there are others which are formed from the less obvious consequences of these revolutions: they are called Cycles and Periods. As the solar cycle, the Easter cycle, the Julian period, &c. See those words.

As there are certain fixed points in the heavens from which astronomers begin their computations, so there are certain points of time from which historians begin to reckon; and these points or roots of time are called eras or epochs. The most remarkable eras are, those of the Creation, the Greek Olympiads, the building of Rome, the era of Nabonassar, the death of Alexander, the birth of Christ, the Arabian Hegira, and the Persian Jesdegird; all which, together with several others of less note, have their beginnings fixed by chronologers to the years of the Julian period, to the age of the world at those times, and to the years before and after the year of Christ's birth.

The vulgar era of Christ's birth was never settled till the year 527, when Dionysius Exiguus, a Roman abbot, fixed it to the end of the 4713th year of the Julian period, which was four years too late; for our Saviour was born before the death of Herod, who sought to kill him as soon as he heard of his birth. And according to the testimony of Josephus (b. xvii. ch. 8.), there was an eclipse of the moon in the time of Herod's last illness; which eclipse appears by our astronomical tables to have been in the year of the Julian period 4710, March 13, at three hours past midnight, at Jerusalem. Now, as our Saviour must have been born some months before Herod's death, since in the interval he was carried into Egypt, the latest time in which we can fix the true era of his birth is about the end of the 4709th year of the Julian period.

The testimony of authors is the second prin-

cipal part of historical chronology. Though no man has a right to be considered as infallible, it would however be making a very unfair judgment of mankind, to treat them all as dupes or impostors; and it would be an injury offered to public integrity, to doubt the veracity of authors universally esteemed, and facts that are truly worthy of belief. When the historian is allowed to be completely able to judge of an event, and to have no intent of deceiving by his relation, his testimony cannot be refused.

The epochs form the third principal part of chronology; being those fixed points in history that have never been contested, and of which there cannot reasonably be any doubt. Notwithstanding that chronologers fix upon the events which are to serve as epochs, in a manner quite arbitrary; yet this is of little consequence, provided the dates of these epochs agree, and that there is no contradiction in the facts themselves.

Medals, monuments, and inscriptions, form the last of the four principal parts of chronology; and this study is but of very modern date, scarce more than 150 years having elapsed since close application has been made to the study of these. To the celebrated Spanheim we owe the greatest obligations, for the progress that is made in this method; and it is by the aid of medals that M. Vaillant has composed his judicious history of the kings of Syria, from the time of Alexander the Great to that of Pompey. Nor have they been of less service in elucidating all ancient history, especially that of the Romans; and even sometimes that of the middle ages.

Besides the foregoing general account, there are some few systems of chronology which may deserve more particular notice, as follows.

Sacred Chronology.—There have been various systems relating to sacred chronology; which is not to be wondered at, as the three chief copies of the Bible give a very different account of the first ages of the world. For while the Hebrew text reckons about 4000 years from the creation to the birth of Christ, and to the flood 1656 years; the Samaritan makes the former much longer, though it counts from the creation to the flood only 1307 years; and the Septuagint removes the creation of the world to 6000 years before Christ, and 2250 years before the flood. Many attempts have been made to reconcile these differences; though none of them are quite satisfactory. Walton and Vossius give the preference to the account of the Septuagint; while others have defended the Hebrew text. See an abstract of the different opinions of learned men on this subject, in Strauchius's Brev. Chron. translated by Sault, p. 166 and 176. See EARTH (Age of).

The Chinese Chronology.—No nation has boasted more of its antiquity than the Chinese: but though they be allowed to trace their origin as far back as the deluge, they have few or no authentic records of their history for so long a period as 500 years before the Christian era. This indeed may be owing to the general destruction of ancient remains by the tyrant Tsin-chi-hoang, in the year 213, or some say 246, before Christ. From a chronology of the Chinese history (for which we are obliged to an illustrious Tartar, who was viceroy of Canton in the year 1724, and of which a Latin translation was published at Rome in 1730), we learn that the most remote epoch of the Chinese chronology does not surpass the first year of Guei-lie-wang, or 424 years before our vulgar era. And this opinion is confirmed by the practice of two of the most approved historians of China, who admit nothing into their histories previous to this period.

The Chinese, in their computation, make use of a cycle of 60 years, called kia-tse, from the name given to the first year of it, which serves as the basis of their whole chronology. Every year of this cycle is marked with two letters which distinguish it from the others; and all the years of the emperors, for upwards of 2000 years, have names in history common to them with the corresponding years of the cycle. Philos. Trans. Abridg. vol. viii. part 4, pag. 13.

According to M. Freret, in his Essays, the Chinese date the epocha of Yao, one of their first emperors, about the year 2145, or 2057, before Christ; and they reckon that their first astronomical observations, and the composition of their calendar, preceded Yao 150 years: from whence it is inferred that the era of their astronomical observations coincides with that of the Chaldeans. But later authors date the rise and progress of the sciences in China from the grand dynasty of Tcheou, about 1200 years before the Christian era, and shew that all historical relations of events prior to the reign of Yao are fabulous. Mem. de l'Histoire des Sciences, &c. Chinois. vol. i. Paris, 1776.

Babylonian, Egyptian, and Chaldean Annals.—These M. Gibert has attempted to reduce to our chronology, in a letter published at Amsterdam in 1743. He begins with shewing, by the authorities of Macrobius, Eudoxus, Varro, Diodorus Siculus, Pliny, Plutarch, St. Augustin, &c. that by a year, the ancients meant the revolution of any planet in the heavens; so that it might consist sometimes of only one day. Thus, according to him, the solar day was the astronomical year of the Chaldeans; and so the boasted period of 473,000 years, assigned to their observations, is reduced to 1297 years nine months; the number of years which, according to Eusebius, elapsed from the first discoveries of Atlas in astronomy, in the 384th of Abraham, to the march of Alexander into Asia in the year 1682 of the same era. And the 17,000 years added by Berosus to the observations of the Chaldeans, reduced in the same manner, will give 46 years and six or seven months; being the exact interval between Alexander's march and the first year of the 122d Olympiad, or the time to which Berosus carried his history.

Epigenius ascribes 720,000 years to the observations preserved at Babylon; but these, according to M. Gibert's system, amount only to 1971 years three months; which differ from Callisthenes's period of 1903 years, allotted to the same observations, only by 68 years, the period elapsed from the taking of Babylon by Alexander, which terminated the latter account, and to the time of Ptolemy Philadelphus, to which Epigenius extended his account.

The Newtonian Principles of Chronology.—Sir Isaac Newton has shewn, that the chronology of ancient kingdoms is involved in the greatest uncertainty: that the Europeans in particular had no chronology before the Persian empire, which began 536 years before Christ, when Cyrus conquered Darius the Mede; that the antiquities of the Greeks are full of fables, because their writings were in verse only, till the conquest of Asia by Cyrus the Persian, about which time Pherecides Syrius and Cadmus Milesius introduced

prose. After this time several of the Greek historians introduced the computation by generations. The chronology of the Latins was still more uncertain: their old records were burnt by the Gauls 120 years after the expulsion of their kings, 64 years before the death of Alexander the Great, and before Christ 388. The chronologers of Gaul, Spain, Germany, Scythia, Sweden, Britain, and Ireland, are of a still later date. For Scythia, beyond the Danube, had no letters, till Ulphilas, their bishop, formed them, about A. D. 276. Germany had none, till it received them from the western empire of the Latins, about A. D. 400. The Huns had none in the days of Procopius, about A. D. 526. Sweden and Norway received them still later.

After a general account of the defects and obscurity of the ancient chronology, sir Isaac observes, that, though many of the ancients computed by generations and successions, yet the Egyptians, Greeks, and Latins, reckoned the reigns of kings equal to generations of men, and three of them to a hundred, and sometimes to 120 years; and this was the foundation of their technical chronology. He then proceeds to evince, from the ordinary course of nature, and a detail of historical facts, the difference between reigns and generations; and that, though the latter from father to son may at an average be reckoned about 33 years, or three of them equal to 100 years, yet when they are taken by the eldest sons, three of them cannot be computed at more than about 75 or 80 years; and the reigns of kings are still shorter, so that 18 or 20 years may be allowed a just medium. He then fixes on four remarkable periods, viz. the return of the Heraclides into the Peloponnesus, the taking of Troy, the Argonautic expedition, and the return of Sesostris into Egypt, after his wars in Thrace; and settles the epocha of each by the true value of a generation. We shall confine ourselves to his estimate of that of the Argonautic expedition. Having fixed the return of the Heraclides to about the 159th year after the death of Solomon, and the destruction of Troy to about the 76th year after the same period, he observes, that Hercules the Argonaut was the father of Hyllus, the father of Cleodius, the father of Aristomachus, the father of Aristodemus, who conducted the Heraclides into Peloponnesus; so that their return was four generations, reckoning by the chief of the family, later than the Argonautic expedition, which therefore happened about 43 years after the death of Solomon. This is farther confirmed by another argument. Æsculapius and Hercules were Argonauts. Hippocrates was the 18th inclusively from the former by the father's side, and the 19th from the latter by the mother's side; allowing 28 or 30 years to each of them, the seventeen intervals by the father, and the eighteen intervals by the mother, will, at a medium, give 507 years; and these, reckoning back from the commencement of the Peloponnesian war, or the 431st year before Christ, when Hippocrates began to flourish, will place the Argonautic expedition in the 43d year after Solomon's death, or 937 years before Christ.

The other kind of reasoning, by which sir Isaac endeavours to establish this epocha, is purely astronomical. The sphere was formed by Chiron and Musæus at the time, and for the Argonautic expedition, as several of the asterisms referring to this event plainly shew: and at this time the cardinal points of the equinoxes and solstices were placed in the middle of the constellations Aries, Cancer, Chelæ, and Capricorn. Our author establishes this point by a consideration of the ancient Greek calendar, which consisted of twelve lunar months, and each month of thirty days, and which required an intercalary month, began sometimes a week or a fortnight before or after the equinox or solstice; and hence the first astronomers were led to the above mentioned disposition of the equinoxes and solstices; and that this was really the case is confirmed by the testimonies of Eudoxus, Aratus, and Hipparchus. On these principles, sir Isaac proceeds to argue in this manner. The equinoctial colure in the end of the year 1689 cut the ecliptic in ♉ 6° 44′, and by this reckoning the equinox was then gone back 36° 44′ since the Argonautic expedition. But it recedes 50″ in a year, or 1° in 72 years, and consequently 36° 44′ in 2645 years; which counted backward from the beginning of 1690, will place this expedition about twenty-five years after the death of Solomon. But, as there is no necessity for allowing that the middle of the constellations, according to the general account of the ancients, should be precisely the middle between the prima arietis, and ultima caudæ, this great author proceeds to examine what were those stars, through which Eudoxus made the colures to pass in the primitive sphere, and in this way to fix the position of the cardinal points. From the mean of five places he finds, that the great circle, which in the primitive sphere, described by Eudoxus, or at the time of the Argonautic expedition, was the equinoctial colure, did, in the end of 1689, cut the ecliptic in ♉ 6° 29′ 15″. He likewise, in this manner, determines the mean plane of the solstitial colure to be 60° ♌ 28′ 46″, and as it is at right angles with the other, concludes that it is rightly drawn. Hence he infers, that the cardinal points, in the interval between that expedition, and the year 1689, have received from those colures 1 sign 6° and 29′; which, allowing 72 years to a degree, amounts to 2627 years; and these counted backwards, as above, will place the Argonautic expedition 43 years after the death of Solomon. Our author has, by other methods of a similar nature, established this epocha, and reduced the age of the world about 500 years. This elaborate system has not escaped censure. M. Freret and M. Souciet have attacked it much on the same ground: the former hath confounded reigns and generations, which are carefully distinguished in this system. The astronomical objections of both have been answered by sir Isaac Newton himself, and by Dr. Halley. Phil. Trans. abr. vol. viii. part iv. p. 4, &c. Newton's Chronology, ch. i. Objections to Newton's Chronology, particularly relating to the Argonautic expedition, were also urged by Dr. Rutherforth and Dr. Bedford; these were replied to with much ingenuity and more ill-nature by the testy Emerson.

Among the earliest writers on chronology, after the discovery of printing, was Paulus Constantinus Phrygio, whose "Chronicon Regum Regnorumque omnium" was printed at Basil in 1534. A second was Bibliander's work, in 1558; and a third, Eggard's "Tabulæ Chronologicæ," printed at Rostock, 1577. Among the most valuable which are now in use upon the continent, are tables of Du Fresnoy and Berger, both originally published in 1719. The title only of the latter, we believe (Synchronistische Universal historie) is known in England; but those of the for-

mer have been long received in credit; although they are now superseded not only by Dr. Blair's Tables, but by professor Playfair's System of Chronology, 1784.

The following, as the greater epochs in the chronology of history, have been selected from Dr. Blair. The history of the intervals may be easily supplied by the memory of a retentive reader, or by reference to Blair's tables.

Bef. Chr.
4004 Creation of the world
3875 The murder of Abel
3874 The birth of Seth
3017 Enoch translated
2348 The deluge
2247 The tower of Babel built
2000 The birth of Abraham
1921 The covenant made with Abraham
1728 Joseph sold into Egypt
1689 The death of Jacob
1635 The death of Joseph, which concludes the book of Genesis
1574 The birth of Aaron
1571 The birth of Moses
1491 God's appearance to Moses in the burning bush
1451 The Israelites under Joshua pass the river Jordan
1285 Deborah defeats the Canaanites
1263 The Argonautic expedition undertaken
1236 The death of Gideon
1188 Jephthah's vow
1184 Troy taken
1117 Sampson betrayed to the Philistines
1104 The return of the Heraclidæ to Peloponnesus
1095 The Israelites ask for a king. Saul anointed
1070 Athens governed by archons
1048 Jerusalem taken by David
1044 The migration of the Ionic colonies from Greece
1023 Absalom's rebellion
1004 Solomon's dedication of the temple
926 The birth of Lycurgus
907 Homer supposed to have flourished
897 The death of Ahab
896 Elijah's translation
814 The kingdom of Macedon begins
800 Jonah prophesies
790 Amos
785 Hosea
758 Nahum
757 Isaiah, who prophesied above 60 years
754 Micah prophesies
753 The æra of the building of Rome
750 The rape of the Sabines
731 Habakkuk prophesies
721 Samaria taken. The first eclipse of the moon upon record
710 Senacherib's army destroyed
696 Isaiah the prophet put to death
686 Archilochus the poet flourishes
677 The combat of the Horatii and Curiatii
658 Byzantium built
648 Cyrene in Africa founded
627 Jeremiah prophesies
628 Zephaniah
623 Draco establishes his laws at Athens
605 The beginning of the captivity
600 Sappho flourishes
593 Ezekiel prophesies
591 Institution of the Pythian games
587 Jerusalem taken by Nebuchadnezzar
560 Pisistratus usurped the tyranny of Athens
558 Daniel prophesies

Bef. Chr.
539 Pythagoras flourishes
536 Cyrus gives an edict for the return of the Jews
528 Haggai prophesies
527 Zechariah
525 Cambyses conquers Egypt
520 Confucius flourishes
515 The temple of Jerusalem finished
509 The consular government begins at Rome
504 Sardis burnt by the Athenians
490 The battle of Marathon
480 The defeat of Salamis
458 Ezra flourishes
456 Nehemiah the prophet
451 Laws of the twelve tables compiled
445 Herodotus reads his history at Athens
432 The Metonic cycle began, July 15
431 Beginning of the Peloponnesian war
431 About this time the history of the Old Testament finishes
401 The retreat of the 10,000 Greeks under Xenophon. The 30 tyrants expelled from Athens by Thrasybulus
398 The military catapultæ invented
390 Plato made his first voyage into Sicily
357 Dionysius the tyrant expelled Syracuse
343 The war between the Romans and Samnites
340 The Carthaginians defeated by Timoleon
336 Philip of Macedon killed by Pausanias
327 Alexander's expedition into India
323 The death of Alexander
322 Demosthenes put to death by Antipater
299 The first barbers came from Sicily to Rome
296 Athens taken by Demetrius Poliorcetes
286 Lysimachus takes possession of Macedon
284 The septuagint translation of the Old Testament thought to have been made
278 The Gauls under Brennus cut to pieces
264 The beginning of the first Punic war
260 The Carthaginians defeated at sea by the Romans
256 Regulus defeated by the Carthaginians
241 Agis, king of Sparta, put to death
235 The temple of Janus shut the first time after Numa
224 The colossus of Rhodes thrown down by an earthquake
218 The second Punic war begins. Annibal passes the Alps
216 The battle of Cannæ
212 Syracuse taken by Marcellus
202 Annibal defeated at Zama
200 The first Macedonian war begins
190 The first Roman army enters Asia
187 Antiochus the Great defeated and killed
170 Paper invented in China
167 The first library erected at Rome
149 The third Punic war begins
146 Carthage destroyed by Publius Scipio
137 Ptolemy Phryocon began a new restoration of learning at Alexandria
116 Cleopatra assumes the government of Egypt
107 Cicero born
101 Marius and Catullus defeat the Cimbri
100 The birth of Julius Cæsar
99 Lusitania conquered by the Romans
89 The Mithridatic war begins
81 Cicero made his first oration
66 Mithridates defeated by Pompey
65 The reign of the Seleucidæ ends in Syria
63 Catiline's conspiracy detected
55 Cæsar's first expedition against Britain

CHRONOLOGY.

Bef. Chr.
50 Cæsar besieges Pompey in Brundusium
48 The battle of Pharsalia
44 Cæsar killed in the senate-house
40 Jerusalem occupied by Antigonus
31 The battle of Actium: Marc Antony and Cleopatra defeated
25 The Egyptians adopt the Julian year
8 Augustus corrects the calendar
4 Our Saviour's birth: four years before the common æra

Christian Æra.

Aft. Christ.
8 Our Saviour disputes with the Jewish doctors
14 Augustus dies at Nola
17 Twelve cities in Asia destroyed by an earthquake
26 St. John the Baptist enters on his ministry
27 John baptizes our Saviour
33 Our Saviour's crucifixion
36 St. Paul converted
37 Tiberius dies at Misenum
39 St. Matthew writes his gospel
43 Claudius's expedition into Britain
44 St. Mark wrote his gospel
51 Caractacus carried in chains to Rome
52 The council of the apostles at Jerusalem
54 The death of Claudius
59 Nero puts his mother Agrippina to death
61 Boadicea, the British queen, defeats the Romans
62 St. Paul sent in bonds to Rome
64 The first persecution against the Christians
66 The Jewish war begins
67 St. Peter and St. Paul put to death
70 Titus destroys Jerusalem
95 The second persecution against the Christians
102 Pliny the younger sends Trajan his celebrated account of the Christians
107 The third persecution against the Christians
118 The fourth persecution against the Christians
130 Adrian rebuilds Jerusalem
135 Conclusion of the Jewish war, when the Jews were all banished Judea
146 The worship of Serapis introduced at Rome
202 The fifth persecution against the Christians
235 The sixth persecution against the Christians
250 The seventh persecution
252 A great pestilence in the Roman empire
257 The eighth persecution of the Christians
269 Zenobia takes possession of Egypt
272 The ninth persecution against the Christians
293 Carausius killed by Alectus
286 The Roman empire attacked by the northern nations. Carausius reigns in Britain
303 The tenth persecution against the Christians
312 Maxentius defeated by Constantine
319 Constantine begins to favour the Christians
325 The first general council of Nice
340 The death of Constantine the Great
343 Persecution of the Christians in Persia
364 The Roman empire divided into the eastern and western
388 The tyrant Maximus defeated
406 The Vandals, Alans, and Suevi, spread into France and Spain
410 Rome taken and plundered by Alaric

Aft. Chr.
420 The kingdom of the French begins upon the lower Rhine
426 The Romans leave Britain
435 The Theodosian codex published
449 The Saxons arrive in Britain
452 The city of Venice takes its rise
455 Rome taken by Genseric
475 Hengist's massacre of the British nobles
476 The western empire finishes
493 The kingdom of Italy passes from the Heruli to the Ostro-Goths
496 Clovis baptized, and christianity embraced in France
506 The Jewish Talmud published
510 Paris made the capital of the French dominions
511 Arthur defeats the Saxons in the battle of Badon-hill
516 The computing of time by the Christian æra introduced by Dionysius
529 The code of Justinian published
533 The digest of Justinian published
536 Rome taken by Belisarius
551 The manufacture of silk introduced into Europe from India by some monks
558 A terrible plague all over Europe, Asia, and Africa, which continues near fifty years
580 Cosroes the Great defeated, and dies of grief
589 Rome overflowed by the Tiber
597 Augustin the monk arrives in England
606 The power of the popes begins
622 The Hegira of Mahomet begins
637 Jerusalem taken by the Saracens
640 Alexandria taken by the Saracens, and the great library there burnt
653 The Saracens take Rhodes, and cut to pieces the famous colossus
709 Ina, king of Wessex, publishes his laws
748 The computing of years from the birth of Christ began to be used in histories about this time
750 The Merovingian race ends in France
751 The second race of the French kings begins with Pepin, surnamed the Little
762 Bagdad built by Almansor
774 Pavia taken by Charlemagne
778 The battle of Ronçevaux
800 The emperors of the West, or of Germany, begin
822 The Saracens besiege Constantinople
810 A civil war among the Saracens
828 The heptarchy of England united under Egbert
832 Painters banished from the Eastern empire
838 The Picts defeated by the Scots
840 The death of Lewis the Debonnaire
843 The French peers make a new division of the French dominions
853 The Normans get possession of some cities in France
867 The Danes conquer Northumberland
872 Alfred defeated by the Danes
878 Alfred conceals himself in Athelney
879 The kingdom of Arles begins
886 The university of Oxford said to have been founded
888 The dominions of Charles le Gros divided into five kingdoms
904 The Hungarians ravage Italy
912 The Normans establish themselves in France under Rollo

After Chr.
936 The Saracen empire divided by usurpation into seven kingdoms
941 Arithmetic brought into Europe
964 The kingdom of Italy conquered by Otho
987 The third race of the French kings begins under Hugh Capet
996 Otho III. makes the empire of Germany elective
1013 The Danes, under Sueno, get possession of England
1035 The kingdoms of Castile and Arragon begin
1043 The Turks take possession of Persia
1057 Malcolm III. kills Macbeth
1065 Jerusalem taken by the Turks from the Saracens
1066 The conquest of England under William duke of Normandy
1080 The Domesday survey compiled
1096 The first crusade to the Holy Land
1110 Learning revived at the university of Cambridge
1118 The order of the knights templars instituted
1140 King Stephen defeated and taken prisoner in the battle of Lincoln
1146 The empress Matilda retires out of England
1147 The second crusade
1151 The canon law composed by Gratian
1154 The party names of Guelfs and Gibbelines begin
1162 The emperor Frederick destroys Milan
1172 Henry II. takes possession of Ireland
1177 Saladin repulsed before Jerusalem
1189 The kings of England and France go to the Holy Land
1192 Richard Cœur de Lion defeats Saladin at Ascalon
1204 Normandy conquered, and re-united to France
1215 Magna Charta signed by king John
1227 The Tartars under Gingis-kan overrun the Saracen empire
1233 The inquisition trusted to the Dominicans
1253 The famous astronomical tables are composed by Alfonso XI. king of Castile
1273 The empire of the present Austrian family begins
1279 The mortmain-act passed in England
1283 Wales conquered by Edward the First
1293 The regular succession of the English parliaments begins
1307 The beginning of the Swiss cantons
1310 The knights of St. John take Rhodes
1312 The knights templars condemned
1346 The battle of Cressy
1349 The order of the garter instituted
1352 The Turks enter Europe
1356 The battle of Poictiers
1381 Wat Tyler's insurrection
1388 The battle of Otterburn
1414 The council of Constance
1440 The art of printing discovered
1455 The battle of St. Albans
1471 The battle of Tewksbury
1478 Lorenzo de Medici expelled Florence
1485 The battle of Bosworth
1497 The Portuguese first sail to the East Indies
1508 The league of Cambray formed
1517 The Reformation begun by Luther
1522 Rhodes taken by the Turks
1527 Rome taken by Charles V.
1534 The Reformation takes place in England
1545 The council of Trent begins

After Chr.
1571 The victory of Lepanto obtained
1572 The massacre of Paris
1582 Pope Gregory introduces the new style
1587 Mary queen of Scots beheaded
1588 The destruction of the Spanish armada
1596 Cadiz taken by the English
1604 Ostend taken by the Spaniards
1608 The invention of the telescope
1614 Napier invents the logarithms
1618 The synod of Dort begins
1619 Harvey discovers the circulation of the blood
1620 Copper money first introduced into England
1621 The civil war with the Huguenots in France
1629 Nine members imprisoned for their speeches in the house of commons
1640 The Scots army enters England
1642 King Charles demands the five members
1645 The battle of Naseby
1649 King Charles beheaded
1652 The first war between the English and Dutch begins
1660 The Restoration of Charles II.
1662 The Royal Society established
1680 A great comet observed
1683 Lord Russel beheaded
1688 The Revolution in England
1692 The sea fight of La Hogue
1704 Gibraltar taken by admiral Rook
1706 The battle of Ramillies
1709 The battle of Pultowa
1720 The South Sea scheme begins
1727 The siege of Gibraltar by the Spaniards
1750 The interest on the public funds reduced to three per cent.
1752 The new style introduced into Great Britain
1766 The American stamp-act repealed
1772 The revolution in Denmark
1773 The order of the Jesuits suppressed
1775 The American war commenced
1779 The siege of Gibraltar begun
1780 The riots in London
1781 Herschel discovered the Georgian planet
1782 The sea fight under Rodney
1783 The preliminaries of a general peace signed. America declared independent
1789 The revolution in France begins
1793 Louis XVI. beheaded
1798 The battle of the Nile
1799 Buonaparte made first consul of France
1801 The planet Ceres discovered by Piazzi
1801 Union with Ireland carried into effect
1802 Peace with France, Holland, &c.
1803 War between England and France
1804 France formed into an empire, Napoleon Buonaparte being crowned emperor, December 2
1804 Planet Juno discovered by Harding
1805 War between England and Spain. London wet docks at Wapping opened. Victory off Trafalgar, and death of Lord Nelson
1806 Mr. Pitt, Mr. Fox, and Lord Cornwallis died. Lord Melville tried and acquitted
1807 Planet Vesta discovered by Olbers.

CHRONOMETER, in general, denotes any instrument or machine used in measuring time; such are dials, clocks, watches, &c. The term chronometer, however, is often used in a more limited sense, for a kind of clock so contrived as to measure a small portion of time with great exactness, even to the sixteenth part

of a second; of such a one, invented by the late ingenious Mr. George Graham, there is a description in Desaguliers's experimental philosophy, which must be allowed to be of great use for measuring small portions of time in astronomical observations, the time of the fall of bodies, the velocity of running waters, &c.

Now, indeed, the word is used, especially by watchmakers and navigators, to denote a watch or portable machine, in which by the nature of the scapement and the compensations for heat and cold, mean time is or ought to be kept with sufficient accuracy to determine the longitude at sea. See SCAPEMENT and TIMEKEEPER.

CHRONOSCOPE, a word sometimes used for a pendulum or machine to measure time.

CHRU'PSIA. (*crupsia*, χρυψια, from χρωα, colour, and οψια, sight.) Visus coloratus. A disease of the eyes, in which the person perceives objects of a different colour from their natural.

CHRYSALIS, or AURELIA, in natural history, a state of rest and seeming insensibility, which butterflies, moths, and several other kinds of insects must pass through, before they arrive at their winged or most perfect state. In this state, no creatures afford so beautiful a variety as the butterfly kinds, and they all pass through this middle state without one exception. The figure of the aurelia or chrysalis generally approaches to that of a cone; or at least the hinder part of it is in this shape; and the creature, while in this state, seems to have neither legs nor wings, nor to have any power of walking. It appears indeed to have hardly so much as life. It takes no nourishment, nor has it any organs for taking any; and its posterior part is all that seems animated, this having a power of giving itself some motions. The external covering of the chrysalis is cartilaginous, and considerably large, and is usually smooth and glossy: but some few of them have a few hairs; some are also as hairy as the caterpillars from which they are produced; and others are rough, and, as it were, shagreened all over. In all of these there may be distinguished two sides; the one of which is the back, the other the belly of the animal. On the anterior part of the latter, there may always be distinguished certain little elevations running in ridges, and resembling the fillets wound about mummies: the part whence these have their origin is esteemed the head of the animal. The other side, or back, is smooth, and of a rounded figure in most of the chrysalises; but some have ridges on the anterior part, and sides of this part; and these usually terminate in a point, and make an angular appearance on the chrysalis.

From this difference is drawn the first general distinction of these bodies. They are by this divided into two classes; the round and the angular kinds. The first are, by the French naturalists, called feves; from the common custom of calling the chrysalis of the silkworm, which is round, by this name. There is something more regular in this distinction than might at first be conceived; for the division is continued from the fly-state: the rounded chrysalises being almost all produced by the phalænæ or moths; and the angular ones by the papilios, or day-flies. There are several subordinate distinctions of these kinds; but, in general, they are less different from one another than the caterpillars from whence they are produced. The head of those of the first class usually terminates itself by two angular parts, which stand separate one from another, and resemble a pair of horns. On the back, eminences and marks are discovered, which imagination may form into eyes, nose, chin, and other parts of the human face.

There is a great variety and a great deal of beauty in the figures and arrangement of the eminences and spots on the other parts of the body of the chrysalises of different kinds. It is a general observation, that those chrysalises which are terminated by a single horn, afford day-butterflies of the kind of those which have buttoned antennæ, and whose wings, in a state of rest, cover the under part of their body, and which use all their six legs in walking, those of many other kinds using only four of them. Those chrysalises which are terminated by two angular bodies, and which are covered with a great number of spines, and have the figure of a human face on their back in the greatest perfection, afford butterflies of the day-kind; and of that class the characters of which are, their walking on four legs, and using the other two, that is, the anterior part, in the manner of arms or hands. The chrysalises which have two angular bodies on their heads, but shorter than those of the preceding, and whose back shows but a faint sketch of the human face, and which have fewer spines, and those less sharp, always turn to that sort of butterfly the upper wings of which are divided into segments, one of which is so long as to represent a tail, and whose under wings are folded over the upper part of the back. A careful observation will establish many more rules of this kind, which are not so perfect as to be free from all exceptions: yet are of great use, as they teach us in general what sort of fly we are to expect from the chrysalis, of which we know not the caterpillar, and therefore can only judge from appearances. These are the principal differences of the angular chrysalises; the round ones also have their different marks not less regular than those.

The greater number of the round chrysalises have the hinder part of their body of the figure of a cone; but the upper end, which ought to be its circular plane base, is usually bent and rounded into a sort of knee; this is generally called the head of the chrysalis; but there are also some of this kind, the head of which is terminated by a nearly plane surface; some of the creeping ten-legged caterpillars give chrysalises of this kind, which have each of them two eminences that seem to bring them towards the angular kind.

Among the angular chrysalises there are some

whose colours seem as worthy our observation as the shapes of the others. Many of them appear superbly clothed in gold. These elegant species have obtained the name of chrysalis and aurelia, which are derived from Greek and Latin words, signifying gold; and from these all other bodies of the same kind have been called by the same names, though less, or not at all, entitled to them. Some are all over of an elegant green, as is the chrysalis of the fennel caterpillar; others of an elegant yellow; and some of a bright greenish tinge, variegated with spots of a shining black; we have a very beautiful instance of this kind in the chrysalis of the cabbage-caterpillar. The general colour of the chrysalis of the common butterflies, however, is brown.

The parts being distinguishable in the chrysalis, we easily find the difference of the species of the fly that is to proceed from it. The naked eye shows whether it be one of those that have, or of those that have not, a trunk; and the assistance of a microscope shows the antennas so distinctly, that we are able to discern whether it belong to the day or night class; and often to what genus, if not the very species: nay, in the plumose horned kinds, we may see, by the antennæ, whether a male or female phalæna is to be produced from the chrysalis; the horns of the female being in this state evidently narrower, and appearing less elevated above the common surface of the body, than those of the male. All these parts of the chrysalis, however, though seen very distinctly, are laid close to one another, and seem to form only one mass; each of them is covered with its own peculiar membrane in this state, and all are surrounded together by a common one; and it is only through these that we see them; or rather we see on these the figures of all the parts moulded within, and therefore it requires attention to distinguish them. The chrysalis is soft when first produced, and is wetted on the front with a viscous liquor; its skin, though very tender at first, dries and hardens by degrees: but this viscous liquor, which surrounds the wings, legs, &c. hardens almost immediately; and in consequence fastens all those limbs, &c. into a mass, which were before loose from one another: this liquor, as it hardens, loses its transparence, and becomes brown; so that it is only while it is yet moist that these parts are to be seen distinct.

It is evident from the whole, that the chrysalis is no other than a butterfly, the parts of which are hid under certain membranes which fasten them together; and, that when the limbs are arrived at their due strength, they become able to break through these membranes, and then expand and arrange themselves in their proper order. The first metamorphosis, therefore, differs nothing from the second, except that the butterfly comes from the body of the caterpillar in a weak state, with limbs unable to perform their offices, while it proceeds from the chrysalis perfect.

Mr. Reaumur, in his History of Insects, vol. i. has given many curious particulars on the structure and uses of the several coverings that attend the varieties of the caterpillar-kind in this state. These creatures in general remain wholly immoveable, and seem to have no business in it but a patient attendance on the time when they are to become butterflies; and this is a change that can happen to them, only as their parts, before extremely soft and weak, are capable of hardening and becoming firm by degrees, by the transpiration of that abundant humidity which before kept them soft: and this is proved by an experiment of Mr. Reaumur, who, inclosing some chrysalises in a glass tube, found, after some time, a small quantity of water at the bottom of it; which could have come there no other way, but from the body of the inclosed animal. This transpiration depends greatly on the temperature of the air; it is increased by heat, and diminished by cold: but it has also its peculiarities in regard to the several species of butterfly to which the chrysalis belongs.

Mr. Reaumur has proved, moreover, that heat and cold make great differences in the time of hatching the butterfly from its chrysalis state: and this he particularly tried with great accuracy and attention, by putting them in vessels in warm rooms, and in ice-houses; and it seemed wholly owing to the hastening or retarding the evaporation of the abundant humidity of the animal in the chrysalis state, that it sooner or later appeared in the butterfly form. He varnished over some chrysalises, in order to try what would be the effect of thus wholly preventing their transpiration; and the consequence was, that the butterfly came forth from these two months later than their natural time. Thus was the duration of the animal in this state lengthened; that is, its existence was lengthened; but without any advantage to the creature, since it was all this time in its state of inaction, and probably of insensibility.

Though this was of no consequence, Mr. Reaumur deduces a hint from it that seems to be of some use. He observes, that hens eggs, of which we make so much use, and eat in so many forms, are properly a sort of chrysalis of the animal: their germ, after they are impregnated by the cock, containing the young animal alive; and waiting only a due degree of warmth to be hatched, and appear in its proper form. Eggs transpire notwithstanding the hardness of their shells; and when they have been long kept, there is a road found near one of their ends, between the shell and the internal membrane. This is a mark of their being stale, and is the effect of an evaporation of part of their humidity: and the same varnish which had been used to the chrysalis, being tried on eggs, was found to preserve them for two years, as fresh as if laid but the same day, and such as the nicest palate could not distinguish from those that were so. (See EGGS.) It is not yet known how much farther this useful speculation might be carried, and whether it might not be of great use even to human life, to invent something that should act in the manner of this varnish, by being rubbed over the body,

as the athletæ did of old, and the savages of the West Indies do at this time, without knowing why. But to return to the insects, which are the subjects of this article; their third state, that in which they are winged, is always very short, and seems destined for no other action than the propagation of the species. See PAPILIO and ENTOMOLOGY.

CHRYSANTHEMUM. Ox-eye daisy. In botany, a genus of the class syngenesia, order polygamia superflua. Receptacle naked; downless; calyx hemispherical, imbricate, with the scales dilated, and membranaceous at the margin. Twenty-six species; chiefly European: though a few, natives of the Cape and East Indies. Of these some have white rays, some yellow, and some doubtful. C. incanum, a native of the Cape, with three-cleft downy leaves, is a shrubby plant; as is also c. pinnatifidum, of Madeira. The rest are all herbaceous. Those common to our own country, are c. leucanthemum, found in our pastures, and often denominated bellis major, or great ox-eye daisy, with leaves clasping, oblong, obtuse, cut, pinnatified at the base; radical ones obovate, petioled: and c. segetum; found in our corn-fields, with leaves clasping, glaucous, jagged at top, toothed towards the base.

CHRYSANTHEMUM (Bastard). In botany. See SILPHIUM.

CHRYSANTHEMUM (Hard-seeded). See OSTEOSPERMUM.

CHRYSARGYRUM, a tribute formerly levied on courtesans, and persons of ill fame.

CHRYSIPPUS, a Stoic philosopher, born at Solos in Cilicia, was disciple to Cleanthus, Zeno's successor. He wrote many books, several of which related to logic. None of the philosophers spoke in stronger terms of the fatal necessity of every thing, nor more pompously of the liberty of man, than the Stoics, Chrysippus in particular. He was so considerable among them, as to establish it into a proverb, that if it had not been for Chrysippus, the porch had never been. Yet the Stoics complained, as Cicero relates, that he had collected so many arguments in favour of the sceptical hypothesis, that he could not answer them himself; and thus had furnished Carneades, their antagonist, with weapons against them. There is an apophthegm of this philosopher preserved, which does him honour. Being told that some persons spoke ill of him, "It is no matter (said he), I will live so that they shall not be believed." He died 207 B. C. aged 80.

CHRY'SIS. Golden-fly. In zoology, a genus of the class insecta, order hymenoptera. Mouth horny, projecting; lip much longer than the jaw, which is linear, membranaceous, and emarginate at the tip; tongueless; feelers four, unequal, filiform; antennas short, filiform, of twelve articulations, the first longest; body gilt, polished; abdomen arched beneath with a scale on each side; tail generally toothed; sting pungent, nearly concealed; wings flat. Thirty-one species; usually found in the holes and crevices of old walls, and for the most part ornamented with a splendid variety of colours and metallic lustre; the former chiefly green and blue, the latter, bright brassy or golden, and bronze.

CHRYSISTRIX. In botany, a genus of the class polygamia, order dioecia. Hermaphrodite: calyx glume two valved; corol of numerous setaceous chaffs; stamens numerous, solitary, between the chaffs; pistil one. Male, pistilless. One species, a native of the Cape.

CHRYSOBERYL, in oryctology. See GUMMA.

CHRYSOBOLANUS. Cocoa-plum. In botany, a genus of the class icosandria, order monogynia. Calyx five-cleft; petals five; style lateral; drupe with a five-grooved, five-valved nut. One species only; a native of America, shrubby, and reaching to the height of nine or ten feet; with white corols, and damson-form plums, of a luscious taste, and much relished by the natives.

CHRYSOCOLLA, in oryctology. See CUPRUM.

CHRYSO'COMA. In botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle naked; down simple; calyx hæmispherical, imbricate; style hardly longer than the florets. Fifteen species, almost all natives of the Cape; all appertaining to which quarter are shrubs or under-shrubs, except c. undulata. The rest, chiefly of Europe, are herbaceous, flowering perennials, from one to two feet high, with narrow leaves, and yellow floscular corols.

CHRYSO'GONUM. In botany, a genus of the class syngenesia, order polygamia necessaria. Receptacle chaffy; seeds crowned with a three-toothed scale, and each inclosed in its proper four-leaved calycle; calyx five-leaved. One species; a native of Virginia.

CHRYSOLITE, in oryctology. See GEMMA.

CHRYSOME'LA. In zoology, a genus of the class insecta, order coleoptera. Antennas moniliform: feelers six, growing larger towards the end; thorax marginate; shells immarginate; body (mostly) oval. Three hundred and forty species, scattered over the globe; a beautiful tribe, and found almost every where in woods and gardens. Their motion is slow, and some of them, when caught, emit an oily liquor of a disagreeable smell; the larvas feed on the leaves of trees and plants. They may be subdivided into the following sections, for which see Nat. Hist. Pl. LVI.

A. Lip entire: hind thighs equal: this section comprises by far the greatest number.

B. Oblong: lip bifid: hind-thighs equal. The family galleruca of Fabricius.

C. Oblong; lip bifid; hind-thighs thickened. By Fabricius named altica.

CHRYSO'PHYLLUM. Bully-tree or star-apple. In botany, a genus of the class pentandria, order monogynia. Corol campanulate, ten-cleft; every other segment spreading; berry ten-seeded. Seven species, all natives of the West Indies. Of these the chief are,

1. C. cainito, a Jamaica tree, rising thirty or forty feet in height, with terminal flowers, and a fruit about the size of our golden pippin; rough and astringent when fresh, but pleasant when mellowed after the manner of our own medlar. There are four varieties of this species.

2. C. glabrum, a native of Martinico; not so tall as the former, with flowers at the sides of the branches, and a more juicy and delicious fruit about the size of a bergamot pear.

CHRYSOSPLE'NIUM. Golden saxifrage. In botany, a genus of the class decandria, order digynia. Calyx four or five-cleft, coloured; corolless; capsule two-beaked, one-celled, half-inferior, half two-valved, many-seeded. Two species; both natives of the shady springs of our own country, and well known.

1. C. alternifolium (alternate-leaved).

2. C. oppositifolium (opposite-leaved).

CHRYSOPRASE, in oryctology. See CHALCEDONIUS.

CHRYSOSTOM (John), a celebrated patriarch of Constantinople, and one of the most admired fathers of the Christian church, was born of a noble family at Antioch, about the year 347. He studied rhetoric under Libavius, and philosophy under Andragathus; after which he spent some time in solitude in the mountains near Antioch: but the austerities he endured having impaired his health, he returned to Antioch, where he was ordained deacon by Meletius. Flavian, Meletius's successor, raised him to the office of presbyter five years after: when he distinguished himself so greatly by his eloquence, that he obtained the surname of Golden Mouth. Nectarius, patriarch of Constantinople, dying in 397, Chrysostom, whose fame was spread throughout the whole empire, was chosen in his room by the unanimous consent of both the clergy and the people. The emperor Arcadius confirmed this election, and caused him to leave Antioch privately, where the people were very unwilling to part with him. He was ordained bishop on the 26th of February 398; when he obtained an order from the emperor against the Eunomians and Montanists; reformed the abuses which subsisted amongst his clergy; retrenched a great part of the expences in which his predecessors had lived, in order to enable him to feed the poor and build hospitals, and preached with the utmost zeal against the pride, luxury, and avarice of the great. But this pious liberty of speech procured him many powerful enemies. He differed with Theophilus of Alexandria, who got him deposed and banished; but he was soon recalled. After this, declaiming against the dedication of a statue erected to the empress, she banished him into Cucusus in Armenia, a most barren and inhospitable place. Afterwards, as they were removing him from Petyus, the soldiers treated him so roughly, that he died by the way, A. D. 407. His works were edited by Saville at Eton, in eight vols. folio, 1613; and by Montfaucon at Paris, in thirteen vols. 1718.

CHRYSTAL, a common but erroneous orthography for CRYSTAL, which see.

CHRYSTALLINE. See CRYSTALLINE.

CHRYSTALLIZATION. See CRYSTALLIZATION.

CHUB, in ichthyology. See CYPRINUS.

CHU'BBED. *a.* Big-headed like a chub.

To CHUCK. *v. n.* To make a noise like a hen.

To CHUCK. *v. a.* 1. To call as a hen calls her young (*Dryden*). 2. To give a gentle blow under the chin (*Congreve*).

CHUCK. *s.* 1. The voice of a hen (*Temple*). 2. A word of endearment (*Shakspeare*). 3. A sudden small noise.

CHUCK-FARTHING. *s.* A play, at which the money falls with a chuck into the hole beneath (*Arbuthnot*).

To CHU'CKLE. *v. n.* (*schaecken*, Dutch.) To laugh vehemently, or convulsively (*Prior*).

To CHU'CKLE. *v. a.* (from *chuck*.) 1. To call as a hen (*Dryden*). 2. To pocket; to fondle (*Dryden*).

CHU'ET. *s.* Forced meat (*Bacon*).

CHUFF. *s.* A coarse blunt clown (*L'Estrange*).

CHU'FFILY. *ad.* Surlily; stomachfully (*Claris.*).

CHU'FFINESS. *s.* (from *chuffy*.) Clownishness.

CHU'FFY. *a.* (from *chuff*.) Blunt; surly.

CHUGANSERIAI, a town of Hindustan Proper, in the province of Cabul. Lat. 34. 55 N. Lon. 70. 8 E.

CHUM. *s.* (*chom*, Armorick.) A chamber-fellow.

CHUMP. *s.* A thick heavy piece of wood (*Mox.*).

CHUMLEIGH. See CHIMLEIGH.

CHUNNAR, a fort of Hindustan Proper, in Allahabad. It is seated on the Ganges, 20 miles above Benares, and is built on a rock, fortified all round by a wall and towers. Lat. 25. 10 N. Lon. 83. 50 E.

CHUNNA, in the Salic law, an 100, or 100 pence.

CHUPMESSAHITES, a sect among the Mahometans, who believe that Jesus Christ is God, and the true Messiah, the Redeemer of the world; but without rendering him any public or declared worship. The word in the Turkish language signifies Protector of the Christians. Ricaut says, there are abundance of these Chupmessahites among the people of fashion in Turkey, and some even in the seraglio.

CHURCH, an assembly of persons united by the profession of the same Christian faith, and the participation of the same sacraments.

Bellarmin, and the Romish divines, to this definition add, Under the same pope, sovereign pontiff, and vicar of Jesus Christ on earth: in which circumstance it is that the Romish and reformed notion of church differ.

Amelotte, and others, make a visible head, or chief, essential to a church: accordingly, among the Catholics, the pope; in England, the king; are respectively allowed heads of the church. Bishop Hoadley sets aside the notion of a visible head: Christ alone, according to

Him, is head of the church; which position he has maintained with great address, in a celebrated sermon before king George I. on these words, My kingdom is not of this world; and in the several vindications thereof. Most of the dissenters from established churches assume this as a principle; as may be seen in Towgood's Justification of Dissent, in answer to Mr. White, and many other books written in defence of the nonconformists.

Sometimes, we consider church in a more extensive sense, and divide it into several branches. The church militant, is the assembly of the faithful on earth. Church triumphant, that of the faithful already in glory. To which the Catholics add the church patient, which, according to their doctrines, is that of the faithful in purgatory.

The term ecclesia, εκκλησια, synonymous with our church, is used in the Greek and Latin profane authors for any kind of public assembly; and even for the place where the assembly is held. The sacred and ecclesiastical writers sometimes also use it in the same sense; but ordinarily they restrain the term to the Christians; as the term synagogue, which originally signifies nearly the same thing, is in like manner restrained to the Jews.

Thus, in the New Testament, the Greek εκκλησια, signifies almost always, either the place destined for prayer, as 1 Cor. xiv. 34, or the assembly of the faithful diffused over the whole earth, as Ephes. v. 24, or the faithful of a particular city, or province, as 2 Cor. viii. 1, or even of a single family, as Rom. xvi. 5, or the pastors or ministers of a church, as Mat. xviii. 17.

The word church is likewise applied to any particular congregation of Christians, who associate together and concur in the participation of all the institutions of Jesus Christ, with their proper pastors and ministers. Thus we read of the church of Antioch, the church of Alexandria, the church of Thessalonica, and the like. 3. Church denotes a particular sect of Christians distinguished by particular doctrines and ceremonies. In this sense, we speak of the Romish church, the Greek church, the Reformed church, the church of England, &c. The Latin or Western church, comprehends all the churches of Italy, France, Spain, Africa, the north, and all other countries whither the Romans carried their language. Great Britain, part of the Netherlands, of Germany, and of the north, have been separated from hence ever since the time of Henry VIII.; and constitute what we call the Reformed church, and what the Romanists call the Western schism. The Greek, or Eastern church, comprehends the churches of all the countries anciently subject to the Greek or Eastern empire, and through which their language was carried; that is, all the space extended from Greece to Mesopotamia and Persia, and thence into Egypt. This church has been divided from the Roman, ever since the time of the emperor Phocas. The Gallican church, heretofore denoted the church of France, under the government and direction of their respective bishops and pastors. 4. The word church is used to signify the body of ecclesiastics, or the clergy, in contradistinction to the laity. (See CLERGY.) 5. Church is used for the place where a particular congregation or society of Christians assemble for the celebration of divine service. In this sense churches are variously denominated, according to the rank, degree, discipline, &c. as metropolitan church, patriarchal church, cathedral church, parochial church, collegiate church, &c. See METROPOLIS, PATRIARCH, &c.

In ecclesiastical writers, we meet with grand church, for the chief church of a place. The first church publicly built by the Christians some authors maintain to be that of St. Saviour at Rome, founded by Constantine: others contend, that several churches abroad, called by the name of St. Peter Vivus, were built in honour of that apostle during his life-time.

CHURCH, with regard to architecture, Daviler defines a large oblong edifice, in form of a ship, with nave, choir, isles, chapels, belfry, &c. (See each part under its proper head). *A simple Church*, is that which has only a nave and a choir. *A Church with aisles*, that which has a row of porticoes, in form of vaulted galleries, with chapels in its circumference. *Church in a Greek cross*, is that where the length of the traverse part is equal to that of the nave; so called because most of the Greek churches are built in this form. *Church in a Latin cross*, that whose nave is longer than the cross part, as in most of the Gothic churches. *Church in Rotundo*, that whose plan is a perfect circle, in imitation of the Pantheon.

Churches were first built in England in the year 696.

To CHURCH. *v. a.* To perform with any one the office of returning thanks in the church, after any signal deliverance, as childbirth.

CHURCH-ALE. *s.* (from *church* and *ale*.) A wake, or feast, commemoratory of the dedication of the church (*Carew*).

CHURCH-ATTIRE. *s.* The habit in which men officiate at divine service (*Hooker*).

CHURCH-SCOT, or CHURCH-ESSET, a payment, or contribution, by the Latin writers frequently called primitiæ seminum; being, at first, a certain measure of wheat, paid to the priest on St. Martin's day, as the first fruits of harvest.

CHURCH-WARDENS (*ecclesiæ guardiani*), in the English ecclesiastical polity, are the guardians or keepers of the church, and representatives of the body of the parish. They are sometimes appointed by the minister, sometimes by the parish, sometimes by both together, as custom directs. They are taken, in favour of the church, to be, for some purposes, a kind of corporation at the common law; that is, they are enabled, by that name, to have a property in goods and chattels, and to bring actions for them, for the use and profit of the parish. Yet they may not waste the church goods, but may be removed by the parish, and then called to account by actions at common

law: but there is no method of calling them to account but by first removing them; for none can legally do it but those who are put in their place. As to lands, or other real property, as the church, church-yard, &c. they have no sort of interest in them; but if any damage is done thereto, the parson only or vicar shall have the action. Their office is also to repair the church, and make rates and levies for that purpose: but these are recoverable only in the ecclesiastical courts. They are also joined with the overseers in the care and maintenance of the poor. They are to levy a shilling forfeiture on all such as do not repair to church on Sundays and holidays; and are empowered to keep all persons orderly while there.

All peers of the realm, clergymen, counsellors, attorneys, clerks in court, physicians, surgeons, and apothecaries, are exempt from serving the office of churchwarden, as is every licenced dissenting teacher.

CHU'RCHYARD. *s.* The ground adjoining the church, in which the dead are buried; a cemetery (*Pope*).

CHURCHILL (John), duke of Marlborough, and prince of the Roman empire. He was born at Ashe, in Devonshire, in 1650; and received an indifferent education, for his father took him to court at the age of twelve years. About 1666 he was made an ensign in the guards, and served for some time at Tangier. In 1672 he was with the duke of Monmouth, who served with the French against the Dutch, and was made captain of grenadiers. The conduct of Mr. Churchill at the battle of Nimeguen gained the particular notice of marshal Turenne, who called him the handsome Englishman. At the siege of Maestricht his bravery was so distinguished, that the French king thanked him particularly at the head of the line. He was made on his return to England lieutenant-colonel, gentleman of the bedchamber, and master of the robes to the duke of York. He attended the prince to Holland, and into Scotland, and about this time married miss Jennings, who waited on lady Ann, afterward queen of Great Britain. He was with James when he suffered shipwreck. In 1682 he was made a peer, by the title of baron Eymouth in Scotland; and when James came to the crown, he was sent ambassador to France to notify the event. In 1685 he was created lord Churchill of Sandridge, in the county of Hertford. The same year he suppressed Monmouth's rebellion, and took him prisoner. He continued to serve king James with great fidelity, till the arrival of the prince of Orange, and then left him, but without taking any soldiers with him. The prince was proud of this acquisition, gave his lordship a gracious reception, and entrusted him with the sole regulation of the army. In 1689 he was sworn of the privy-council, and made one of the gentlemen of the bed-chamber to the king, and created earl of Marlborough. The same year he was sent to Holland as commander of the English forces. He next served in Ireland, and reduced Cork, with other strong places. But notwithstanding these important services, he was suddenly dismissed from his employments, and committed to the Tower; from whence, however, he was soon released. The cause of this injustice has never yet been explained. After the death of queen Mary he came again into favour, and the king committed to his tuition the duke of Gloucester, with this compliment, "My lord, make him but what you are, and my nephew will be all that I wish to see him." At the close of that reign he had the command of the English forces in Holland, and was besides appointed ambassador-extraordinary to the states, who chose him captain-general of their forces, with a salary of 100,000 florins per annum. At the commencement of queen Ann's reign the earl came to England, and recommended a speedy war with France and Spain; which advice was adopted. On June 20, 1702, he took the command of the army, and in the first campaign made himself master of a number of strong towns, particularly Liege, which was carried sword in hand. He returned to England the following winter, and received the thanks of both houses, with the honour of a dukedom from the queen. The next spring he set out again for the continent; where his actions were too numerous to admit of detail in this place. In 1704 he joined prince Eugene, with whom he fought the French and Bavarians at Hochstet, and obtained a complete victory, taking the marshal Tallard prisoner. Just before this he had been created by the emperor a prince of the empire, with the consent of the queen. In the winter he returned to England, bringing with him the marshal Tallard, and 26 other officers of rank, 121 standards, and 179 colours. He again received the thanks of parliament, and the grant of the manor of Woodstock, within the hundred of Wotton, to him and his heirs for ever. The next campaign was not distinguished by any extraordinary actions, but in 1706 he fought the famous battle of Ramillies, May 12, in which his life was repeatedly in the most imminent danger, a cannon shot taking off the head of colonel Bingly, as he was helping the duke to remount. This great victory accelerated the fall of Louvain, Brussels, and other important places. He arrived in England in November, and received fresh honours and grants from the queen and parliament. A bill passed to settle his titles upon the male and female issue of his daughters; and Blenheim-house was ordered to be built to perpetuate his gallant actions. He had also a pension of 5000l. a year granted him out of the post-office. The following campaign presented nothing worth recording; but the ensuing one was pushed with such vigour, that the French king was glad to enter into a negociation for peace, which came to nothing. In 1709 he had the honour to defeat marshal Villars, whom Lewis the XIV. boasted "had never been beat," at Malplaquet; for which victory, a general thanksgiving was solemnized. When the new ministry came in, the duke, though no friend to, nor liked by them, continued his exertions,

and perfectly humbled marshal Villars. In the winter of 1711 he returned to England, having added considerably to his laurels; but soon after he was dismissed from his employments. To add to this unjust treatment, a prosecution was commenced against him for applying the public money to his private purposes. The host of ministerial writers, a set of literary hornets, who are always to be found in the train of corruption, attacked him in pamphlets and newspapers. Stung at this ingratitude, he went into voluntary banishment, accompanied by his duchess; and remained abroad till 1714, when he landed at Dover, and was welcomed again with the acclamations of the people. Queen Anne was just dead, and her successor restored the duke to his military appointments; but his infirmities increasing, he retired from public employment; and died at Windsor lodge, having survived his intellectual faculties, June 16, 1722. His remains were interred with great pomp in Westminster abbey. The duke had four daughters, who married into the first families of the kingdom. His duchess outlived him several years. (*Watkins*).

Churchill (Charles) an English poet. He was the son of a clergyman, who was curate of St. John's, Westminster, and was born in 1731. He received his education at Westminster school, but was refused matriculation at Oxford, on account of his insufficiency; he then returned to Westminster, and married when very young. At the age of twenty-three he was ordained, and went to serve a small curacy in Wales, where he turned dealer in cyder; but becoming bankrupt, he returned to London, and succeeded his father: he also taught young ladies to read and write. His first literary performance was the Rosciad, which had so great a success that it stimulated him to further exertions in the satyrical line. He now became quite the bon-vivant, cast aside the gown, discarded his wife, and joined a company of men by whom he was flattered, but by whom he could not be improved. When Wilkes came on the stage, as the patriot of the day, Churchill became his attendant and champion, for which he was caricatured by Hogarth, and in return fired an epistle against the painter, which, it is said, broke his heart. He died November 5, 1764, at Boulogne, whither he had gone on a visit to Mr. Wilkes. (*Watkins*).

Churchill fort, is seated on the E. side of Hudson's bay, in North America. Lat. 58. 48 N. Lon. 94. 3 W.

CHURCHING of women after child-birth, took its rise from the Jewish rite of purification. In the Greek church it was limited to the fortieth day after delivery; but in the western parts of Europe no certain time is observed. There is an office in the liturgy for this purpose.

CHU'RCHMAN. *s.* (*church* and *man*.) 1. An ecclesiastick; a clergyman (*Clarendon*). 2. An adherent to the church of England.

CHURCH-STRETTON, a town of Shropshire, with a market on Thursdays. Lat. 52. 32 N. Long. 2. 46 W.

CHURL, *s.* (ceopl, Saxon.) 1. A rustick; a countryman (*Dryden*). 2. A rude, surly, ill-bred man (*Sidney*). 3. A miser; a niggard (*Shakspeare*).

CHU'RLISH. *a.* (from *churl*.) 1. Rude; brutal; harsh; austere (*Shakspeare*). 2. Selfish; avaricious (*King*). 3. Unpliant; cross-grained; unmanageable; harsh; not yielding (*Mortimer*). 4. Vexatious; obstructive (*Crashaw*).

CHU'RLISHLY. *ad.* (from *churlish*.) Rudely; brutally (*Howel*).

CHU'RLISHNESS. *s.* (from *churlish*.) Brutality; ruggedness of manner (*L'Estrange*).

CHURME. *s.* A confused sound; a noise (*Bacon*).

CHURN. *s.* (properly *chern*, from *kern*. Dut. cepene, Sax.) The vessel in which butter is, by agitation, coagulated (*Gay*).

The churn, as very often constructed, is a kind of deep wooden tub, of a conical shape; resting on its base, and having closely fitted into its upper part, a cover of wood, with a hole in its centre to admit the handle of the churn-staff. This staff consists of a long upright pole, to the bottom of which is fixed a broad kind of foot, perforated at different parts, and calculated to occasion a more universal agitation of the milk in churning. Many attempts have been made to improve this very necessary implement; but none have in any degree been accepted in our dairies, except what is called the barrel-churn, which is nothing more than a kind of rolling barrel, with such an apparatus within as is calculated to quicken the process of making butter. We find, however, the following account of an improved churn by Mr. Bowler, in the Transactions of the Society for the Encouragement of Arts, &c. for 1795.

"The churn itself is of the barrel-kind, being a cylinder, eighteen inches diameter, and nine inches wide, the sides wood, and the rim tin-plate, having two openings; the one eight inches and a half long, by four inches wide, through which the cream is put into the churn, and the hand introduced for cleaning it; the other, a short pipe, one inch diameter, by which the butter-milk runs out of the churn when the operation is finished. The first of these openings has a wooden cover, fastened down by two screws, and the other a cork fitted to it, while the butter is churning. There is also, near the larger opening, a small vent-hole with a peg, to allow a passage for any air discharged from the cream at the beginning of the operation. An axle passes through the churn, terminating in two gudgeons on which it hangs, its lower part being immersed in a trough, to occasionally hold hot or cold water according to the season of the year; and on the inside of the rim are four projecting pieces of wood, with holes in them, serving to beat the cream by the motion of the churn: this motion is caused by a pendulum, three feet six inches long, having an iron bob, weighing ten pounds, and at its upper end turning a pulley, ten inches diame-

ter, from which goes a rope twice round another pulley, about three inches diameter, fixed on the axis of the churn, and causing it to make a partial revolution by each vibration of the pendulum. There are sliding covers to the machinery, and also a cover to the water-trough, in order, when the hot water is used, to secure the steam, and keep the cream in a due and necessary degree of warmth. The motion of the pendulum is given and kept up by a wooden rod, about three feet nine inches long, turning on a pin about three inches above the bob of the pendulum."

A figure of this churn may be seen in Gregory's Mechanics, vol. ii. or in vol. iv. of the Repertory of Arts and Manufactures. Mr. Raley's patent horizontal churn is described in the seventh volume of the Repertory.

The Indian churn has an alternate motion, being worked by a vertical pole, which is turned much the same as a hand-lathe; having its lower part split, the pole occasions great agitation in the cream. A great variety of churns are in use; but in general their formation evinces more ingenuity than practical knowledge. Those moved by pedals, and of which, as well as of the Indian churn, an accurate description is given in the Agricultural Magazine for October, 1807, merit particnlar attention for their great simplicity and many good qualities. See also the Retrospect of Discoveries, no. 11.

To CHURN. *v. n.* (*kernen*, Dutch.) 1. To agitate or shake any thing by a violent motion (*Dryden*). 2. To make butter by agitating the milk.

CHURNING, in country affairs, the operation of making butter by agitating milk in a well known vessel called a churn. For accelerating this operation, a correspondent in the Bath Society Papers recommends a little distilled vinegar to be poured into the churn; and the butter will be produced in an hour afterwards. He would not, however, recommend it to be used till the cream has undergone some considerable agitation.

CHU'RRWORM. *s.* (from cẏnnan, Sax.) An insect that turns about nimbly; called also a fancricket. See GRYLLOTALPA.

CHUSAN, an island on the E. coast of China, where the English East India Company once had a factory. Lat. 30. 0 N. Lon. 124. 0 E.

CHUSISTAN, or KUSISTAN, a province of Persia, bounded on the north by the Irak Agemi, on the east by Farsistan, on the south by the Gulf of Persia, and on the west by the Tigris, which separates it from the Arabian Irak. The country is extensive, but thinly inhabited. It produces corn, rice, cotton, sugar, tobacco, and dates. The northern part is mountainous, but the southern flat and marshy. This country was called by the Greeks Susiana, from Susa the capital.

CHYLA'CEOUS. *a.* (from *chyle*). Belonging to chyle; consisting of chyle (*Floyer*).

CHYLE, CHYLUS. The milk-like liquor, observed some hours after eating, in the lacteal vessels of the mesentery and in the thoracic duct. It is separated by digestion from the chyme, and is that fluid substance from which the blood is formed.

It is a compound or third substance produced from the gastric juice and the nutritive matter employed; the amount of which are about equal in the process of its formation.

The chyle is absorbed by the mouths of the lacteal vessels, which are in the greatest number in the jejunum and ilium, whilst the feculence of the chyme, and the bile, are propelled into the large intestines. The chyle of the human body smells like milk, has a sweetish taste, a white colour, and a consistence thinner than blood or milk. Yet the lacteals of birds are strictly pellucid; and hence they are scarcely entitled to this name, but to that of lymphatics alone. It is doubted, even in the human subject, whether the stomach have any lacteals: none have satisfactorily been traced in it; and hence Dr. Fordyce contended that its only office was to form the nutriment it received into a pultaceous mass called chyme, the more fluid part of which was absorbed by the lymphatics.

Its specific gravity is less than that of the blood, and hence it is that chyle is occasionally seen swimming on the blood, if a vein be opened some hours after eating. The quality of the chyle is similar to that of milk; for like it, it coagulates and ascesces; but sometimes its nature is altered from bad digested food or medicines: thus the chyle becomes blue from eating indigo; yellow, from the yolk of eggs, &c. The quantity of chyle depends upon that of the ingesta and their greater or less nourishing power: from five or six pounds of food, very little more than two pounds of chyle are elaborated.

The constituent principles of chyle are, 1. Water, which forms its greatest part. 2. Oily cream, which chemistry teaches to be hydrogen and carbon. 3. Cheese, which, by the vis vitalis, is formed of the carbon and azot of the ingested food. 4. Earth, which is obtained from lacteal calculi, that are occasionally found in the receptaculum chyli and lacteals. 5. Animal lymph, which is mixed with the gastric and enteric juices.

The nutritive principles of vegetables are starch, an albuminous principle, oil, vegetable gluten, and sugar. The nutritive principles of animal substances, are oil, jelly, and animal gluten; and hence the reason why the chyle, separated from vegetables, is of the same matter with that prepared from animal ingesta, is, that the principles of both are dissolved into their elements, which are the same in animal and vegetable foods: thus the cream of the chyle is formed of carbon and hydrogen; and the cheese of the chyle, from the carbon and azot of both animal and vegetable substances.

The chyle is mixed with the albuminous and gelatinous lymph in the thoracic duct, which receives them from the lymphatics.

The uses of the chyle are, 1. To supply the matter from which the blood and other fluids

of the body are prepared; from which fluids the solid parts are formed. 2. By its ascescent nature, it somewhat restrains the putrescent tendency of the blood: hence the dreadful putridity of the humours from starving; and thus milk is an excellent remedy against scurvy. 3. By its very copious aqueous latex, it prevents the thickening of the fluids, and thus renders them fit for the various secretions. 4. The chyle secreted in the breasts of puerperal women, under the name of milk, forms the most excellent nutriment of all aliments for new born infants. For the rest, see LACTEALS and LYMPHATICS.

CHYLIFA'CTION. *s.* (from *chyle.*) The act or process of making chyle in the body (*Arbuthnot*).

CHYLIFA'CTIVE. *a.* (*chylus* and *facio*, Lat.) Having the power of making chyle.

CHYLIFICATION. (*chylifactio*, from *chylus*, and *fio*, to make.) The process, carried on in the small intestines, and principally in the duodenum, by which the chyle is separated from the chyme.

CHYLOPOIETIC. (*chylopoieticus*, χυλοποιετικος, from χυλος, chyle, and ποιεω, to make.) Any thing connected with the formation of chyle; thus chylopoietic viscera, chylopoietic vessels, &c.

CHYLOSIS. (χυλωσις, from χυλιζω, to express the juice from a substance.) The same as chylification.

CHY'LOUS. *s.* (from *chyle.*) Consisting of chyle; partaking of chyle (*Arbuthnot*).

CHYME. (*chymus*, from χυμος, which signifies humour or juice.) The ingested mass of food, that passes from the stomach into the duodenum, and from which the chyle is prepared in the small intestines by the admixture of the bile, &c.

CHYMISTRY. See CHEMISTRY.

CHYMOSIS. See CHEMOSIS.

CHYNLEN RADIX, a cylindrical root, of the thickness of a goose-quill, brought from China. It has a bitterish taste, and imparts a yellow tinge to the saliva. The Chinese hold it in great estimation as a stomachic, infused in wine.

CIACONIUS (Peter), a Spanish critic, born at Toledo in 1525, and died at Rome in 1581. He was one of those employed by Gregory XIII. in correcting the calendar, and published some of the Latin classics.

CIBA'RIOUS. *a.* (*cibarius*, Lat.) Relating to food; useful for food; edible.

CIBBER (Colley), a celebrated comedian, dramatic writer, and poet laureat to the king, was born at London in 1671. His father, Caius Gabriel Cibber, was a native of Holstein, and a skilful statuary, who executed the basso-relievo on the pedestal of the monument, and the two admired figures of lunatics over the piers of the gate to Bethlem hospital in Moorfields. Colley, who derived his Christian name from the surname of his mother's family, was intended for the church, but betook himself to the stage, for which he conceived an early inclination; though he was some time before he acquired any degree of notice, or even a competent salary. His first essay in writing was the comedy of Love's Last Shift, acted in 1695, which met with success; as did his own performance of the character of the fop in it. From that time, as he says himself, "My muse and my spouse were so equally prolific, that the one was seldom the mother of a child, but in the same year the other made me the father of a play. I think we had a dozen of each sort between us; of both which kinds some died in their infancy, and near an equal number of each were alive when we quitted the theatre." The Careless Husband, acted in 1704, met with great applause, and is reckoned his best play; but none was of more importance to him than the Non-juror, acted in 1717, and levelled against the Jacobites. This laid the foundation of the misunderstanding between him and Mr. Pope, raised him to be the hero of the Dunciad, and made him poet-laureat in 1730. He then quitted the stage, except a few occasional performances; and died in 1757. Cibber neither succeeded in acting nor in writing tragedy; and his odes were not thought to partake of the genius or spirit he shewed in his comedies.

CIBORIA, in antiquity, a drinking cup made of the husk of Egyptian beans.

CIBORIUM, a kind of covering or tent for the Romish altar; it was supported by four columns.

CIBUS FEREALIS, an ancient funereal entertainment.

CICA'DA. Grass-hopper. In zoology, a genus of the class insecta, order hemiptera. Snout inflected; antennas setaceous; the four wings membranaceous and deflected; legs, in most, formed for leaping.

These insects live on various plants; the larva is apterous; the pupa furnished with the mere rudiments of wings; both of them six-footed, and active; the male of the perfect insect chirps like the cricket; a chirp which among the poets of ancient and modern times, has been ascribed, but erroneously, to both sexes, and to every individual indiscriminately. It is a numerous genus, and consists of not less than two hundred and eighty-seven species, scattered over the four quarters of the globe; thus subdivided into sections.

A. Antennas subulate; inserted on the front. The membracis tribe of Fabricius.

B. Legs not formed for leaping. In Fabricius, tethigonia.

C. Antennas filiform, inserted under the eyes; of which

α. Those with lip abbreviated, truncate, emarginate, form the tribe cercopis in Fabricius.

β. Those with lip rounded, setaceous at the tip; are alone in Fabricius comprised under the name cicada.

Of all these we can instance but one or two species. The following are the most remarkable:

1. C. plebeja. Scuted, two-spined at the tip; upper wings with four anastomoses, and

six ferruginous lines. Inhabits Africa and Italy.

2. C. orni. Upper wings with six concatenate dots within the margin, the inner anastomoses brown; inhabits southern Europe. These two species form the cicadas of the Roman and Grecian poets. During the hottest part of the day in summer, the males, sitting among the leaves of trees, make a shrill and continual chirping; and so strong and stridulous is its note, that a single cicada hung up in a cage, has been found almost to drown the voice of a whole company. The mode by which this sound is produced is curious. It proceeds from a pair of concave membranes, seated on each side the first joints of the abdomen: the large concavities of the abdomen, immediately under the two broad lamellæ in the male insect, are also faced by a thin, pellucid, irridescent membrane, serving to increase and reverberate the sound; and a strong muscular apparatus is exerted for the purpose of moving the necessary organs.

3. C. spumaria. Brown; upper wings with two whitish lateral spots. Inhabits Europe. The larva and pupa of this and some other species of the genus discharge a frothy matter from numerous pores about the tail, in which they soon become completely enveloped. This matter is frequently found in summer upon various plants, and is commonly known by the name of cuckoo-spit. The perfect insect, when attempted to be caught, will sometimes spring to the distance of two or three yards. See Nat. Hist. Pl. LVI.

CICATRICE. See CICATRIX.

CICATRI'SANT. *s.* (from *cicatrice.*) An application that induces a cicatrice.

CICATRI'SIVE. *a.* (from *cicatrice.*) Having the qualities proper to induce a cicatrice.

CICATRIS, a trunk or stem. In botany, a scarred stem. Marked with the remains of leaves that have fallen off.

CICA'TRIX. (*cicatrix*, from *cicatrico*, to skin.) A scar.

CICATRIZA'TION. *s.* (from *cicatrice.*) 1. The act of healing the wound (*Harvey*). 2. The state of being healed or skinned over.

To CI'CATRIZE. *v. a.* To apply such medicines to wounds as heal and skin them over. 2. To heal and skin a wound over.

CICCA. In botany, a genus of the class monoecia, order tetrandria. Male: calyx four-leaved; corolless. Female: calyx three or four-leaved; corolless; styles four, two-parted; capsule four-grained; seeds solitary. One species only: a native tree of China, with long, simple branches, alternate, two-rowed leaves; axillary flowers in sessile heads.

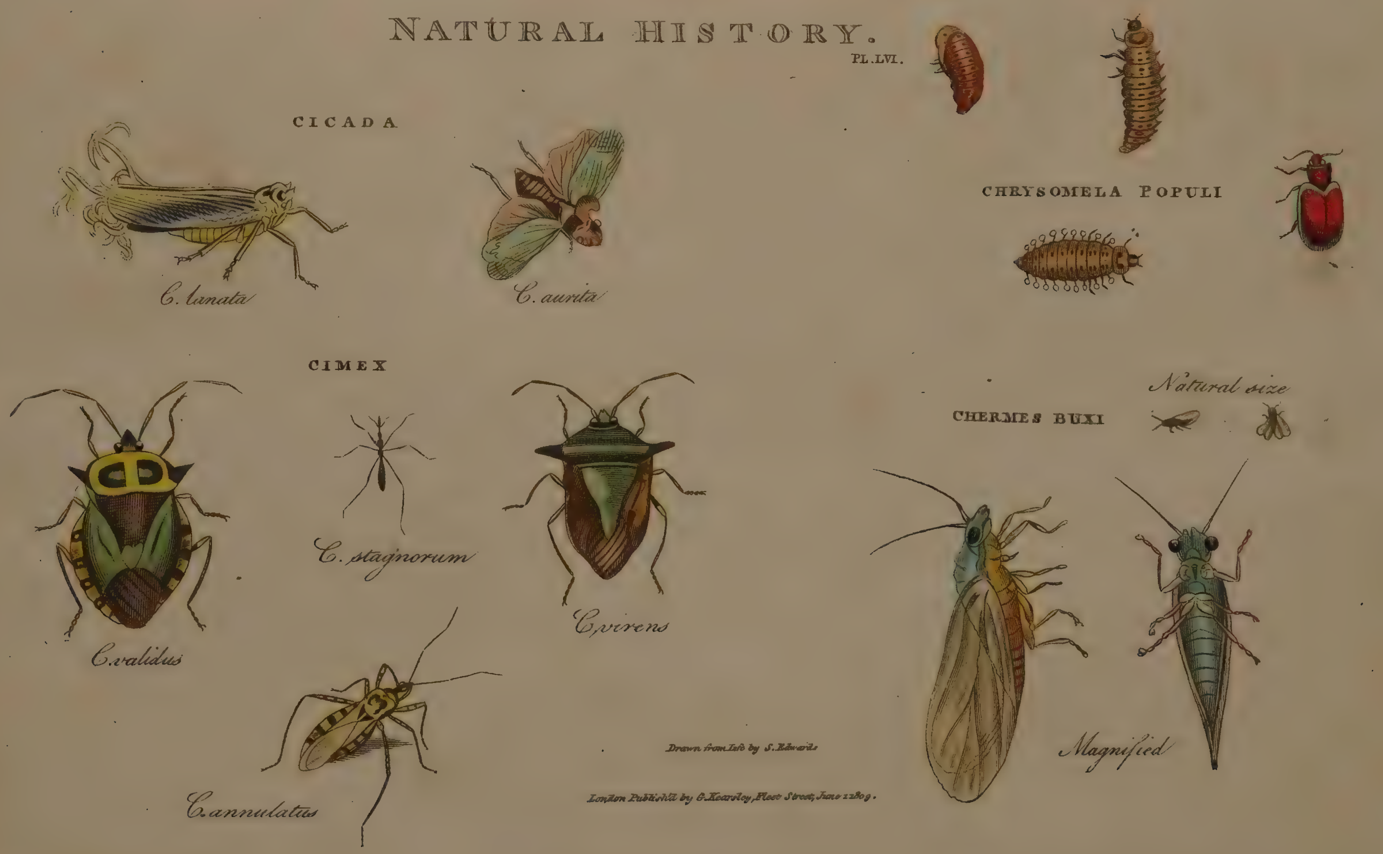
CICELY (Sweet). In botany. See SCANDIX.

CICER. (Of uncertain origin, unless it be from the Greek, κικυς, strength. The Cicerones had their name from this pulse, as the Pisones had from the pisum or pea, and the Lentuli from the lens or lentil.) E. ερέβινθος, chick-pea. In botany, a genus of the class diadelphia, order decandria. Calyx five-parted, as long as the corol; the four upper segments incumbent on the banner; legume turgid, two-seeded. Two species only.

1. C. arietinum; with one-flowered peduncles; seeds globular, gibbous; leaflets serrate; a native of Spain. The seeds have been formerly employed medicinally, but are now no longer in use. In some places they are toasted and used as coffee; and in others ground into flour for bread. From the varying colour of the aril of the seeds, they have the trivial distinction of cicer album, rubrum, or nigrum.

2. C. lens, common lentil: indigenous to most parts of Europe; with peduncles chiefly two-flowered; seeds compressed; leaflets very entire. For the rest, see HUSBANDRY.

CICERO (Marcus Tullius), the celebrated Roman orator, was born at Arpinum about 107 years B.C. The name is from *cicer*, a vetch or lentil, because, according to Plutarch, he had an excrescence on his nose (others say on one of his cheeks) resembling a vetch. He was son of a Roman knight, and lineally descended from the ancient kings of the Sabines. His mother's name was Helvia. After having displayed promising abilities at school, he was taught philosophy by Philo, and law by Mutius Scævola. He perfected a taste for military knowledge in the Marsian war, and retired from Rome, to indulge his philosophic propensities. He was naturally of a weak and delicate constitution, and he visited Greece on account of his health. On his return, he soon distinguished himself above all the speakers of his age in the Roman forum. When he went to Sicily as quæstor, he behaved with great justice and moderation; and the Sicilians remembered with gratitude the eloquence of Cicero, their common patron, who delivered them from the tyranny and avarice of Verres. After he had passed through the subordinate offices of the state, he stood a candidate for the consulship, A. U. C. 689; and the patricians and the plebeians were equally anxious to raise him to the dignity, against the efforts and bribery of Catiline, who, with many dissolute and desperate Romans, had conspired against their country, and combined to murder Cicero himself. His extreme vigilance, however, baffled all Catiline's projects; and this desperate conspirator marched out in triumph to meet the 20,000 men who were assembled to support his cause. Petreius, the lieutenant of C. Antony, the other consul, defeated them in Gaul, and Cicero, at Rome, punished the rest of the conspirators with death. After this memorable deliverance, Cicero received the thanks of the people, and was styled, The father of his country, and a second founder of Rome. The vehemence with which he had attacked Clodius proved injurious to him; and when his enemy was made tribune, Cicero was banished from Rome, though 20,000 young men were supporters of his innocence. He was not, however, deserted in his banishment. After sixteen months absence, he entered Rome with universal satisfaction; and was



NATURAL HISTORY.
PL.LVI.
CICADA
C. lanata
C. aurita
CHRYSOMELA POPULI
CIMEX
C. stagnorum
C. virens
C. validus
C. annulatus
Natural size
CHERMES BUXI
Magnified
Drawn from Life by S. Edwards
London Published by G. Kearsley, Fleet Street, June 1 1809.

sent, with the power of pro-consul, to Cilicia.—After much hesitation, he espoused the cause of Pompey against Cæsar, and when victory had declared in favour of Cæsar, at the battle of Pharsalia, Cicero went to Brundusium, and was reconciled to the conqueror, who treated him with great humanity. From this time Cicero retired into the country, and seldom visited Rome. When Cæsar had been stabbed in the senate, Cicero recommended a general amnesty. But when he saw the interest of Cæsar's murderers decreased, and Antony come into power, he retired to Athens. He soon after returned, but lived in perpetual fear of assassination. The great enmity which Cicero bore to Antony was fatal to him; and Augustus, Antony, and Lepidus, the newly-formed triumvirate, in order to destroy all cause of quarrel, and each to dispatch his enemies, produced their list of proscription. About two hundred were doomed to death, and Cicero was among them, upon the list of Antony. Augustus yielded a man to whom he partly owed his greatness, and Cicero was pursued by the emissaries of Antony. He had fled in a litter towards the sea of Caieta; and when the assassins came up to him, he put his head out of the litter, and it was severed from the body by Herennius. This memorable event happened in December, 45 B.C. after the enjoyment of life for 63 years, 11 months, and five days. The head and right hand were carried to Rome, and hung up in the Roman forum. Cicero has acquired more real fame by his literary compositions than by his spirited exertions as a Roman senator. The learning and the abilities which he possessed have been the admiration of every age and country, and his style has always been accounted as the true standard of pure latinity. He was of a timid disposition; and he who shone as the father of Roman eloquence, never ascended the pulpit to harangue, without feeling a secret emotion of dread. His conduct, during the civil wars, was far from that of a patriot. He married two wives, Terentia, and a young woman to whom he was guardian, but repudiated them both. The works of this celebrated man, of which, according to some, the tenth part is scarce extant, have been edited by the best scholars in every country. There is a very admirable edition by Paul Manutius in 10 vols. 8vo. 1540—41. The Elzevir edition of 1642, in 10 octavo vols. is very beautiful and correct. And Foulis's Glasgow edition of 1749, in 20 volumes, is much and deservedly admired. See farther Dibdin's Introduction to the Classics, and Clarke's Bibliographical Dictionary, vol. ii.

As an orator Cicero is thus characterised by Dr. Blair: "In all his orations his art is conspicuous. He begins commonly with a regular exordium: and with much address prepossesses the hearers, and studies to gain their affections. His method is clear, and his arguments are arranged with exact propriety. In a superior clearness of method, he has an advantage over Demosthenes. Every thing appears in its proper place. He never tries to move till he has attempted to convince; and in moving, particularly the softer passions, he is highly successful. No one ever knew the force of words better than Cicero. He rolls them along with the greatest beauty and magnificence; and in the structure of his sentences is eminently curious and exact. He amplifies every thing; yet though his manner is generally diffuse, it is often happily varied and accommodated to the subject. When an important public object rouses his mind, and demands indignation and force, he departs considerably from that loose and declamatory manner to which he at other times is addicted, and becomes very forcible and vehement. This great orator, however, is not without his defects. In most of his orations there is too much art, even carried to a degree of ostentation. He seems often desirous of obtaining admiration rather than of operating by conviction. He is sometimes, therefore, showy rather than solid, and diffuse where he ought to have been urgent. His sentences are always round and sonorous. They cannot be accused of monotony, since they possess variety of cadence; but from too great a fondness for magnificence, he is on some occasions deficient in strength. Though the services which he had performed to his country were very considerable, yet he is too much his own panegyrist. Ancient manners, which imposed fewer restraints on the side of decorum, may in some degree excuse, but cannot entirely justify, his vanity."

CICERONIAN. *a.* Of an eloquence similar to that of Cicero's; an eloquence that blazes rather than thunders.

CICHORA'CEOUS. *a.* (from *cichorium*, Latin.) Having the qualities of succory (*Floyer*).

CICHORIUM, (*cichorium*, originally, according to Pliny, an Egyptian name, and adopted by the Greeks. It is written sometimes κιχορειον; whence Horace has—*cichoréæ, levesque malvæ:* sometimes κιχόριον, or κιχωριον. It is supposed to have this name, παρα το δια των χωριων κιειν, from its creeping through the fields). Succory; cichory. In botany, a genus of the class syngenesia, order polygamia æqualis, receptacle somewhat chaffy; calyx invested with scales; seeds crowned with numerous short teeth. Five species scattered over the globe: of which the following are alone worth noticing:

1. C. intybus. Wild succory; found in the wastes of our own country; with flowers in pairs axillary, sessile; leaves runcinate; abounding with a milky juice, of a penetrating, bitter taste: every part of the plant, whether root, seeds, or flowers, was formerly used medicinally in the cure of intermittents; as well as, from their aperient quality, in inflammatory affections.

2. C. endivia. Endive. A native of India, now common to almost every culinary garden in England: and which may be regarded either as an annual or a biennial, while c. intybus is perennial. If the seeds of c. endivia be sown early in the spring, the plant com-

monly reaches perfection and produces seeds during the summer, and then perishes in autumn. But if the seeds be not sown till June or July, the plant will grow to its full size in the autumn; but the seeds stalks will not shoot up till the ensuing spring; and consequently it may be preserved in this mode in a state of perfection through the whole of the winter; and consistently with the common nature of annuals and biennials it will not perish till it has seeded.

CICHORY, in botany. See CICHORIUM.

CICINDELA. In zoology, a genus of the class insecta, order coleoptera. Antennas setaceous; feelers six, filiform; the hind ones hairy; mandible prominent, armed with many teeth; eyes prominent, thorax rounded, margined, narrower than the head. In general constituting a very beautiful genus of insects. They are found in dry, sandy places, and prey with the most ravenous ferocity upon all other insects that come in their way, and which they are able to overcome. The larva is soft, white, long, six-footed, with a brown, scaly head, and lurks in a round perpendicular hole in the ground, with its head at the entrance to draw in and devour whatever insects may fall in, or come near it. Sixty species scattered over the globe: of which some are characterised by a three-toothed lip: others, constituting a smaller number, by a lip rounded, pointed, and entire. This last section forms the tribe denominated by Fabricus elaphorus. The following are chiefly worthy of notice:

1. C. campestris. Field-sparkler; greengold: shells with six white dots. It inhabits Europe, and is one of the most beautiful species. The green is a bright grass green; the head, thorax, and limbs are of a rich gilded cast; the eyes black and prominent; legs long and slender, length about six lines.

2. C. sylvatia. Black; shells or wing-sheaths with a white wavy band, and two or three white spots. Inhabits Europe; frequents woods, and is less common than c. campestris.

3. C. cyatia. Blue, polished; mouth testaceous: a large species inhabiting India.

CICINUM OLEUM, (Κίκινος; from κικι, the ricinus). An oil, obtained by boiling the bruised seeds of the jatropha curcas of Linnéus. It is somewhat similar in its properties to castor oil. See RICINUS.

CICINUS. The cicinum oleum, or oleum ricini:—Castor oil. Cicinus should seem to be the proper name, and ricinus only a vitious mode of writing it.

CICISBEO, an Italian term, which in its etymology signifies a whisperer; it has been bestowed in Italy both on lovers, and on those who to outward appearance act as such, attending on married ladies with as much attention and respect as if they were their lovers.

CICLUI, or CICLOUGH, a frontier town of Dalmatia. Lat. 43. 29 N. Lon. 18. 22 E.

To CI'CURATE. *v. a.* (*cicuro*, Latin.) To tame; to reclaim from wildness (*Brown*).

CICURA'TION. *s.* The act of taming or reclaiming from wildness (*Ray*).

CICUTA. Cowbane. In botany, a genus of the class pentandria digynia. Fruit subovate, grooved; florets uniform. Three species:

1. C. virosa. Water hemlock, found wild in the ditches of our own country: with opposite-leaved umbels; stipules running up the petioles, obtuse, an extremely poisonous plant; and at times eaten by mistake for wild smallage. It was formerly used in medicine, but has been long omitted in the materia medica.

2. C. bulbifera: a native of Canada and Virginia, with bulbiferous branches.

3. C. maculata. Found also in Virginia, with stem spotted with purple.

CICUTA OFFICINALIS. The hemlock of the dispensatories, which have disputed concerning the origin of the name. It may be from *cis* and *cutis*; as referring to the hollowness of its seed, which seems to the casual observer to be nothing more than a reed surrounded by a cuticle, and hence adaptable to musical tones. By others it is supposed to be sicuta quasi cœcuta, blind; because it destroys the sight of those who use it. Cicuto also signifies the internode, or space between two joints of a reed; the hollow stem of any plant which the shepherds used for making their rural pipes. *Est mihi disparibus septem conjuncta cicutis fistula.* —Virgil. This plant, conium maculatum of Linnéus, is found in almost every part of England, and is distinguished from those which bear some resemblance to it by the spotted stem. It is generally believed to be a very active poison. When exhibited in immoderate doses, it produces anxiety, cardialgia, vomiting, convulsions, vertigo, coma, and death. Baron Stoerk was the first who brought hemlock into repute as a medicine of extraordinary efficacy; and although it does not effect the wonderful cures of cancer it was said to perform, it certainly possesses narcotic and antispasmodic virtues. There is scarcely any disease, to which human nature is subject, in which this remedy, like mercury, is not exhibited internally by some physicians; and in those of the glandular system it appears sometimes to be productive of benefit. Nor is it less efficacious when applied externally: a poultice made of oatmeal and the expressed juice, or a decoction of the extract, when the former cannot be obtained, allays the most excruciating torturous pains of a cancer, and thus gives rest to the distracted patient. See CONIUM.

CIDARIS, in antiquity, the mitre worn by the Jewish high priests.

CI-DEVANT. (French.) Heretofore.

CIDER. See CYDER.

CI'DERIST. *s.* A maker of cider (*Mort.*).

CI'DERKIN. *s.* (from *cider.*) The liquor made of the gross matter of apples, after the cyder is pressed out (*Mortimer*).

CIENFUEGIA. In botany, a genus of the class monadelphia, order dodecandria. Calyx double; the outer of twelve setaceous leaves; petals five; style filiform; stigma clavate, capsule three-celled, three seeded. One species only; a native of Senegal.

CILIA, (*cilium*). The eye-lashes.

CILIAR LIGAMENT. Ligamentum ci-

liare. In anatomy, the circular portion that divides the choroid membrane from the iris, and which adheres to the sclerotic membrane. It appears like a white circular ring.

CILIARY PROCESSES. The white plicated striæ, covered with a black matter, which proceed from the uvea to the crystalline lens, upon which they lie.

CI'LIARY. *a.* (*cilium*, Latin.) Belonging to the eyelids (*Ray*).

CILIATE LEAF. In botany, (from *ciliæ*, the eye-lashes.) The edge guarded by parallel bristles longitudinally: as in drosera, crassula coccinea and cymosa, erica tetralix and ciliaris, &c. It is applied also to the stipule; the spike; and the corol; as in rue, menyanthes, tropæolum. This term is frequently but improperly translated FRINGED, which answers to the Latin FIMBRIATUS, or FIMBRIATE. See these words.

CILICIA, an ancient kingdom of Asia, lying between the 36th and 40th degree of north latitude: bounded on the east by Syria, or rather by Mount Amanus, which separates it from that kingdom; by Pamphylia on the west; by Isauria, Cappadocia, and Armenia Minor, on the north; and by the Mediterranean sea on the south.

CILI'CIOUS. *a.* (from *cilicium*, haircloth, Latin.) Made of hair (*Brown*).

CILICIUM, a sort of habit made of coarse stuff, formerly worn by the Jews in times of mourning and distress. It is the same with what the Septuagint and Hebrew versions call sackcloth.

CILIUM. The hair on the eyelid and the eyelid.

CILLEY, an ancient and famous town of Germany, in Upper Carniola. Lat. 46. 21 N. Lon. 15. 15 E.

CIMA, or SIMA, in architecture. See CYMATIUM.

CIMABUE (Giovanni), a celebrated painter, was born at Florence, in 1240, and was the reviver of painting in Italy, being instructed by the Grecian painters, who were sent for by the senate of his native city. He painted in fresco and distemper, and many of his pieces are still in existence in the Franciscan church at Asceci, a city of Umbria. He was also a good architect, and was employed in building some noble structures. He died at the age of 60.

CIMBRI, an ancient Celtic nation, inhabiting the northern parts of Germany. They are said to have been descended from the Asiatic Cimmerians, and to have taken the name of Cimbri when they changed their old habitations. When they first became remarkable, they inhabited chiefly the peninsula now called Jutland, and by the ancients Cimbrica Chersonesus.

CIMBRICUM BELLUM, was begun by the Cimbri and Teutones, by an invasion of the Roman territories, B.C. 109. These barbarians in the first battle destroyed 80,000 Romans, under the consuls Manlius and Servilius Cæpio. But Marius, in a second engagement at Aquæ Sextiæ, left dead of the Teutones on the field of battle 20,000, and took 90,000 prisoners, B.C. 102. The Cimbri, in the following year, penetrated into Italy, where at the river Athesis, Marius and his colleague Catulus defeated them with the loss of 140,000 slain. This last battle put an end to this dreadful war, and the two consuls entered Rome in triumph. (*Flor. Plut. in Mario.*)

CIME'LIARCH. *s.* (from κειμηλιαρχης.) The chief keeper of things of value belonging to a church.

CIME'LIARCH also denotes the vestry.

CI'METER. *s.* (*cimitarra*, Spanish.) A sort of sword, short and recurvated (*Dryden*).

CIMEX. Bug. In zoology, a genus of the class insecta, order hemiptera. Snout inflected; antennas longer than the thorax: wings four, folded crosswise, the upper ones coriaceous on the upper part; back flat; thorax margined; legs formed for running. The most numerous genus in entomology; consisting of not fewer than eight hundred and twenty-eight species that have been specifically detected and characterised. They are scattered over the globe, and may be subdivided into the following sections, for several of which see Nat. Hist. Plate LVI.

A. antennas inserted before the eyes, comprising,

α. Lipless bugs, by Fabricius denominated acanthia.

β. Insects with lip long, subulate; to which tribe alone Fabricius gives the name cimex. Some of which have the scutel as long as the abdomen; and the body ovate; others a spinous thorax and ovate body; others again a spinous thorax and oblong body; and others, and by far the largest collection, an unarmed thorax and ovate body.

γ. Insects with lip short, rounded; body long, linear. The gerris of Fabricius.

δ. Insects with sheath four-jointed, the first membranaceous; body long and narrow. The Fabrician family misis.

B. Antennas inserted above the eyes; denominated by Fabricius reduvius.

We can only notice a single species or two.

1. C. lectularius. Horse-bug. Bed-bug. Apterous; body ferruginous; a troublesome and nauseous inhabitant of most houses in large cities; crawling about in the night-time to suck the blood of such as are asleep, and hiding itself in the day-time in the most retired holes and crevices. In sucking it is a perfect glutton, never ceasing unless disturbed till it is completely gorged and can hold no more. The greater part of this genus are cannibals in their kind; and hence the horse-bug will at times feast on the smaller species of its own tribe, while itself becomes occasionally the prey of many of the field-bugs. But the most inveterate foe of the house-bug seems to be the spider, who, whenever he has opportunity, seizes him with great eagerness, and feasts upon him with voracity. See BUG.

2. C. paradoxus. Membranaceous thorax and abdomen lobate and ciliate with spines. Inhabits the Cape of Good Hope, and so ex-

actly resembles a dead and withered leaf, that Sparman, who first noticed it, took it for such till he observed its flittering motion. This insect appears, therefore, to be doubly secure from attack; first by its resemblance to what would be avoided by all other insects, and next by its being so curiously beset with prickles on every side.

CIMICIFUGA. In botany, a genus of the class polyandria, order tetragynia. Calyx four-leaved; corol four cup-shaped nectaries, capsules four; seeds scaly. One species only; a native of Siberia; the flowers of which are said by their fetid and peculiar smell to drive away bugs.

CIMINUS, a lake and mountain of Italy. (*Virgil.*)

CIMMERII, a people near the Palus Mœotis. Another nation on the western coast of Italy. Their country was supposed to be so gloomy, that, to mention a great obscurity, the expression of cimmerian darkness has proverbially been used. (*Hom. Virg.* &c.)

CIMOLIA ALBA. (*cimolia*, κιμωλια; from Κιμωλος, Cimolus, an island in the Cretan sea, where it is procured.) Tobacco-pipe clay. Its medical virtues are similar to those of the bolar earths; but it is now never administered medicinally. See ARGILLA.

CIMOLIA PURPURESCENS. Fullers earth. A bolar earth, of a greyish brown colour.

CIMOLITE, in oryctology. See ARGILLA.

CIMON, an Athenian, son of Miltiades and Hegisipyle. When his father died, he was imprisoned, because unable to pay the fine laid upon him by the Athenians; but he was released from confinement by his sister and wife Elpiniœ. He behaved with great courage at the battle of Salamis, and rendered himself popular by his munificence and valour. He defeated the Persian fleet, and took 200 ships, and totally routed their land army the very same day, near the river Eurymedon, in Pamphylia. He was shortly after banished Athens, but again recalled, adjusted the dispute existing between the Athenians and Lacedæmonians, and was afterwards appointed to carry on the war against Persia, in Egypt and Cyprus, with a fleet of 200 ships; and on the coast of Asia, he gave battle to the enemy, and totally ruined their fleet. He died as he was besieging the town of Citium, in Cyprus, B.C. 449, in the 51st year of his age. He may be called the last of the Greeks, whose spirit and boldness defeated the armies of the barbarians. He fortified and embellished the city with the money obtained, and by his victories and his munificence has been highly extolled by his biographers: he has also been praised for leaving his gardens open to the public.

CINÆ SEMEN. See SANTONICUM.

CINARA, (*cinara*, κιναρα; from κινεω, to move; quasi movet ad venerem.) Common artichoke. Cynara scolymus; foliis subspinosis pinnatis indivisisque, calycinis squamis ovatis, of Linnéus. A native of the southern parts of Europe, but cultivated here for culinary purposes. The leaves are bitter, and afford, by expression, a considerable quantity of juice, which, when strained, and mixed with an equal quantity of white wine, has been given successfully in dropsies; but it is very uncertain in its operation.

CINCHONA, (*cinchona*, so named from the countess del Cinchon, the lady of a Spanish viceroy, whose cure in the year 1646 is said first to have brought the Peruvian bark into reputation; or perhaps it may be derived from *kinkina*, its Indian name. In 1649 a Jesuit brought a considerable quantity of it into Italy, which was distributed by the fathers of that order; from which circumstance it was called Jesuit's bark.) Quinquina, or Peruvian bark. In botany, a genus of the class pentandria, order monogynia. Corol funnel-form, five-cleft; capsule inferior, two-celled, two partite; the valves parallel to the partitions, opening inwardly. Twelve species; all natives of the East or West Indies; some with downy flowers, and included stamens; others with glabrous corols and exserted stamens. The chief are:

1. C. cinchona officinalis. Peruvian, or Jesuit's bark; a native tree of Peru: the bark of which is brought to us in pieces of different sizes, some rolled up into short thick quills, and others flat; the outside is brownish, and generally covered in part with a whitish moss; the inside is of a yellowish, reddish, or rusty iron colour. The best sort breaks close and smooth, and proves friable betwixt the teeth: the inferior kinds appear, when broken, of a woody texture, and in chewing separate into fibres. The former pulverises more easily than the latter, and looks, when powdered, of a light brownish colour, resembling that of cinnamon, or somewhat paler. It has a slight smell, approaching to mustiness, yet so much of the aromatic kind as not to be disagreeable. Its taste is considerably bitter, adstringent, very durable in the mouth, and accompanied with some degree of aromatic warmth, but not sufficient to prevent its being ungrateful. The medicinal properties of this drug are very considerable. It cures intermittent, remittent, nervous, and putrid fevers; putrid sore throat, scarlatina, and dysentery; stops excessive discharges, and is in general use as a tonic and stomachic; it is also of infinite service in local affections, as gangrene, scrophula, ill conditioned ulcers, rickets, scurvy, &c. and in most diseases where there is no inflammatory diathesis. The officinal preparations of this bark are the powder, the extract, the tincture, and the decoction.

2. C. angustifolia. Narrow-leaved Peruvian-bark-tree.

3. C. Caribæa. Caribbean-bark-tree.

4. C. floribunda. St. Lucia-bark-tree: with elliptic pointed leaves; terminal panicle; and turbinate capsules. A native of the West Indies, and especially of the island of St. Lucia. This species is also employed medically for the same purposes as the rest.

CINCINNATUS (Lucius Quintius), a

celebrated Roman, who was informed, as he ploughed his fields, that the senate had chosen him dictator. Upon this he left his ploughed land with regret, and repaired to the field of battle, where his countrymen were closely besieged by the Volsci and Æqui. He conquered the enemy, and returned to Rome in triumph; and 16 days after his appointment, he laid down his office, and retired back to plough his fields. In his 80th year he was again summoned against Præneste as dictator; and after a successful campaign, he resigned the absolute power he had enjoyed only 21 days, disregarding the rewards that were offered him by the senate. He flourished about 460 years before Christ.

CINCINNUS. In old medicine, the hair on the temples. See CAPILLUS.

CINCTURE, in architecture, a ring or list at the top and bottom of the shaft of a column, separating it at one end from the base, and at the other from the capital.

CI'NDER. *s.* (*ceindre*, French.) 1. A mass ignited and quenched (*Waller*). 2. A hot coal that has ceased to flame (*Swift*).

CINDER-WOMAN. CINDER-WENCH. *s.* A woman, whose trade is to rake in heaps of ashes, and gather cinders (*Arbuthnot*).

CINEAS. The most celebrated of this name is a Thessalian, minister and friend to Pyrrhus, king of Epirus, sent to Rome by his master to sue for a peace, which he, however, could not obtain. He, at his return, told Pyrrhus, that the Roman senate was a venerable assembly of kings; and observed, that to fight with them, was to fight against another Hydra. He was of such a retentive memory, that the day after his arrival at Rome he could call every senator and knight by his name. (*Pliny*).

CINERARIA. Flea-wort. In botany, a genus of the class syngenesia, order polygamia superflua. Receptacle naked; down simple, calyx simple, many-leaved, equal. Fifty-three species: chiefly natives of the Cape and south of Europe: but those of them indigenous to our own country are: c. palustris met with in our marshes, and c. integrifolia on our mountains. About a third have flowers without rays, and the rest radiated flowers.

CINERARIUS, anciently, any one who paid a veneration to the ashes of martyrs and saints.

CINERA'TION. *s.* (from *cineres*, Lat.) The reduction of any thing by fire to ashes.

CINEREOUS. In natural history, of the colour of wood-ashes.

CINERES CLAVELLATI, (*clavellatus*; from *clavus*, a wedge. The name of cineres clavellati originated from the little wedges or billets into which the wood was cut to make potash). Kali impurum. Impure potash. Potash, in this state, is called in the new chemical nomenclature, carbonas potassæ alkalescens. It is from this salt the various preparations of the kali are made; as the sal alkalinus fixus vegetabilis purificatus, the kali præparatum, the aqua kali, the lixivium causticum, the kali purum, &c.

CINERES RUSSICI. Impure Russian potash.

CINERES ÆTNÆ, a saline substance, or powder resembling ashes, thrown out of mount Ætna during an eruption.

CINERITIOUS. CINNERITIOUS, (*cineritius*; from *cinis*, ashes). Of the colour of ashes. A name applied to the cortical substance of the brain, from its resemblance to an ash colour.

CI'NERULENT. *a.* Full of ashes.

CI'NGLE. *s.* (from *cingulum*, Latin.) A girth for a horse.

CINIS, a name given by Dr. L. Mitchell, of New York, to a peculiar kind of alkaline earths which he states to have discovered in the ashes of burnt wood, after the saline substances have been extracted by lixivation, &c. The doctor does not otherwise describe it than by saying that it is materially different from every other species of earth, that it is very plentiful, of a whitish colour and an alkaline quality, that it constitutes the excellence of wood-ashes as a manure, and that it is an ingredient in the composition of the ancient cements. See his Letter addressed to Dr. Pearson, in Philosophical Magazine, xvii. 267.

CINNABAR, a beautiful red powder much used in painting: it is composed of sulphur and mercury, in the proportion, according to Seguin, of $13\frac{1}{3}$ parts of the former to $86\frac{2}{3}$ of the latter; and from its composition is now termed SULPHURET OF MERCURY, to which term, as also to the word MERCURY, the reader is requested to refer. There are several methods of preparing this useful substance; that proposed by Kirchoff is as follows.—He directs to triturate 300 grains of mercury and 68 of sulphur with a few drops of solution of potash, in a Wedgwood's or glass mortar, until a black powder (Ethiop's mineral) is produced. To this are to be added 160 grains of potash dissolved in as much water, and the trituration is to be continued, the vessel being kept heated by the flame of a candle or lamp. Add water, as evaporation may render it necessary, so that the black oxyd may be kept covered to the depth of about an inch. When the trituration has been continued about 2 hours the mixture changes from a black to a brown colour, and then passes rapidly to a red. The trituration is to be continued, but no more water is to be added; the mass, when brought to the consistence of a jelly, becomes more and more bright, very quickly; and when it has acquired its utmost degree of beauty, the heat must be instantly withdrawn, otherwise the colour will be changed to a dirty brown. It has been observed by count de M. Pouschkin, that the change of a brown may be prevented by taking the vessel from the fire as soon as the mass has first acquired a red colour. By exposing it for two or three days to a gentle heat, adding a few drops of water, and occasionally stirring the mixture, the colour at length becomes excel-

lent. Cinnabar may also be formed by decomposing sulphuret of antimony by means of corrosive sublimate, or oxymuriate of mercury, aided by distillation. When cinnabar is reduced to a very fine powder by levigation, it constitutes the very beautiful pigment known in commerce under the name of vermilion.

Cinnabar is frequently found native, in the state of an ore in almost all mercurial mines, sometimes in veins, sometimes disseminated, sometimes in grains, and sometimes crystallized. It is a heavy mineral, varying in spec. gr., from 5·419 to 10·1285; brittle; and of a very deep red colour when it is in the lump. It is easily sublimated without decomposition: in the humid way it is scarcely possible to decompose it by any known chemical agent; but by the aid of fire, it will yield its sulphur to the fixed alkalies, lime and other earths, and several of the metals; of these iron is the most convenient, affording the means of readily procuring the mercury in a state of purity, by sublimation, while the sulphur enters into combination with the iron. Before the blow-pipe native cinnabar evaporates with a blue flame and sulphureous smell. See the two articles already mentioned.

CINNABAR FACTITIA. See HYDRARGYRUS SULPHURATUS RUBER.

CINNABAR NATIVA. See CINNABAR.

CINNAMON, (*cinnamomum*, κινναμωμον; from *chinamon*, Arab.). Cinnamon. The tree which affords the true cinnamon, which is its inner bark, is the laurus cinnamomum of Jacquin, a native of Ceylon. Laurus foliis trinerviis ovato-oblongis: nervis versus apicem evanescentibus. Cinnamon bark is one of the most grateful of the aromatics; of a very fragrant smell, and a moderately pungent, glowing, but not fiery taste, accompanied with considerable sweetness, and some degree of adstringency. It is one of the best cordial, carminative, and restorative spices we are in possession of, and is generally mixed with the diet of the sick. The essential oil, on account of its high price, is seldom used: a tincture, simple and spirituous water, are directed to be kept in the shops. The flowers of this plant are called flores cassiæ in the shops. See LAURUS CINNAMOMUM.

CINQUAIN, in ancient military language, an order of battle composed of five battalions or five squadrons.

CINQUE, (French). Five.

CINQUE-FOIL, a kind of five-leaved clover. See POTENTILLA.

CINQUE-FOIL (Bastard). See SIBBALDIA.

CINQUE-FOIL (Marsh). See COMARUM.

CINQUE-PACE. *s.* (*cinque pas*, French.) A kind of grave dance (*Shakspeare*).

CINQUE-PORTS, *Quinque portus*, five havens that lie on the east part of England, towards France; thus called by way of eminence, on account of their superior importance; as having been thought by our kings to merit a particular regard, for their preservation against invasions. They have a particular policy, and are governed by a keeper, with the title of lord warden of the cinque-ports; which office belongs to the constable of Dover: and their representatives are called barons of the cinque-ports. Their privileges were granted by king John, upon condition they should provide 80 ships at their own charge for 40 days, as often as the king should need them in the wars.

These five ports are, Hastings, Romney, Hythe, Dover, and Sandwich; to which Winchelsea and Rye have been since added. Thorn tells us, that Hastings provided twenty-one vessels; and in each vessel twenty-one men. To this port belong Seaford, Pevensey, Hedney, Winchelsea, Rye, Hamine, Wakesburn, Creneth, and Forthelipe. Romney provided five ships, and in each twenty-four men. To this belong Bromhal, Lyde, Oswarstone, Dangemares, and Romenhal. Hythe furnished five ships, and in each twenty-one seamen. To this belongs Westmeath. Dover, the same number as Hastings. To this belong Folkston, Feversham, and Marge. Lastly, Sandwich furnished the same with Hythe. To this belong Fordiwic, Reculver, Serre, and Deal.

CINQUE-SPOTTED. *s.* Having five spots (*Shakspeare*).

CINTRA, a town of Portugal, in Estramadura, situated between the mountains of Cintra, anciently called the Mountains of the Moon, at the mouth of the Tagus. Here was a palace built by the Moors, which was destroyed by an earthquake in the year 1655, and rebuilt by king Joseph in the same style; it contains four parish churches, and 1900 inhabitants: thirteen miles N.W. Lisbon.

CINTRE, in building. See CENTER.

CINYRA, a Jewish musical instrument, nearly the same with cithara, lyra, or psalterium. Josephus informs us that it had 10 strings, and was touched with a bow.

CINYRAS, in fabulous history. The most celebrated of this name is a king of Cyprus son of Paphus, who married Cenchreis, by whom he had a daughter called Myrrha. Myrrha fell in love with her father; and in the absence of her mother, she introduced herself into his bed by means of her nurse. Cinyras had by her a son called Adonis; and when he knew the incest he had committed, he attempted to stab his daughter, who escaped his pursuit and fled to Arabia, where, after she had brought forth, she was changed into a tree, which still bears her name. Cinyras, according to some, stabbed himself. (*Ovid. Hynin.* &c.)

CI'ON. *s.* (*sion*, or *scion*, French.) 1. A sprout; a shoot from a plant (*Howel*). 2. The shoot engrafted on a stock (*Bacon*).

CIOTAT, a seaport of France, in the department of the Mouths of the Rhone, and late province of Provence. It is famous for Muscadine wine. Lat. 43. 12 N. Lon. 5. 46 E.

CIPHER, or CYPHER, one of the numeral characters, or figures, thus formed 0. The word comes from the Hebrew *saphar*, to number.

The cipher of itself signifies nothing, or

implies a privation of value; but when combined with other numeral characters, it alters their value in a tenfold proportion, for every cipher so annexed; viz., when set after a figure in common integral arithmetic, it increases its value in that proportion, though it has no effect when set before or to the left hand side of figures; but on the contrary, in decimal arithmetic, it decreases their value in that proportion when set before the figures, but has no effect when set after them.

Cipher is also a kind of enigmatic character, composed of several letters interwoven, which are generally the initial letters of the person's names for whom the ciphers are intended. These are frequently used on seals, coaches, and other moveables.

Cipher denotes likewise certain secret characters disguised and varied, used in writing letters that contain some secret, not to be understood but by those between whom the cipher is agreed on.

As the writing in cipher is become an art; so is the reading or unravelling of it called deciphering. The rules of deciphering are different in different languages; but in fact, it is difficult, if not impossible, to apply any general rules to detect an art which is arbitrary in its nature, and which frames specific rules for itself in every different instance. Instead of dwelling therefore on this subject, we shall proceed to describe certain contrivances employed for communicating intelligence by way of cipher:

1. *The corresponding spaces.* Take two pieces of pasteboard or stiff paper, through which you must cut long squares, at different distances, as you will see in the following example. One of these pieces you keep yourself, and the other you give to your correspondent. When you would send him any secret intelligence, you lay the pasteboard upon a paper of the same size; and in the spaces cut out, you write what you would have understood by him only, and then fill up the intermediate spaces with somewhat that makes with those words a different sense. For instance:

$\boxed{\text{I shall be}}$ much obliged to you, as reading $\boxed{\text{alone}}$ engages my attention $\boxed{\text{at}}$ present, if you will lend me any one of the $\boxed{\text{eight}}$ volumes of the Spectator. I hope you will excuse $\boxed{\text{this}}$ freedom; but for a winter's $\boxed{\text{evening}}$ I $\boxed{\text{don't}}$ know a better entertainment. If I $\boxed{\text{fail}}$ $\boxed{\text{to return}}$ it soon, never trust me for the time $\boxed{\text{to come.}}$

A paper of this sort may be placed four different ways, either by putting the bottom at the top or by turning it over; and by these means the superfluous words may be the more easily adapted to the sense of the others.

This is a very eligible cipher, as it is free from suspicion, but it will do only for short messages: for if the spaces be frequent, it will be very difficult to make the concealed and obvious meanings agree together: and if the sense be not clear, the writing will be liable to suspicion.

2. *By a dial.* On a piece of pasteboard, represented in plate 40. fig. 4. draw three circles, and divide them into 26 equal parts, in each of which must be written one of the letters of the alphabet. On the inside of this there must be another circle of pasteboard, moveable round a pin in the centre, and the extremity of this must be divided into the same number of equal parts as the other. On this also must be written the letters of the alphabet, which, however, need not be disposed in the same order. The person with whom you correspond must have a similar dial, and at the beginning of your letter you must put any two letters that answer to each other when you have fixed the dial.

Suppose for example, you would write as follows: "If you will come over to us, you shall have a pension, and you may still make a sham opposition." You begin with the letters *Ma*, which shew how the dial is fixed: then for *If you*, you write *un juc*, and so for the rest. The whole will appear thus: *Ma un juc iumm svar vgrx qv. cd gvc dlhmm bhgr h yrkduvk hkt—juc ahi dqumm ahlr h dbha vyyvduquvk.*

3. *The musical cipher.* The construction of this cipher is similar to that of No. 2. The circle plate 40. fig. 3. is to be divided into twenty-six equal parts: in each part there must be wrote one of the letters of the alphabet; and on the anterior circle, which is moveable round the centre, there is to be the same number of divisions. The circumference of the inner circle must be ruled in the manner of music paper; and in each division there is to be placed a note differing either in figure or position. Lastly, within the musical lines place the three keys; and on the outer circle, the figures that are commonly used to denote the time.

Then provide yourself with a ruled paper, and place one of the keys, as suppose that of *g re sol*, against the time two-fourths at the beginning of the paper, which will inform your correspondent how to fix his circle. You then copy the notes that answer to the several letters of the words you intend to write, in the manner expressed at fig. 5.

A cipher of this sort may be made more difficult to discover by frequently changing the key, and that will not in the least embarrass the reader. You may likewise add the mark ※ or ♭ to the note that begins a word, which will make it more easy to read, and at the same time give the music a more natural aspect. This cipher is preferable to that of No. 2. as it may be inclosed in a letter about common affairs, and pass unsuspected.

There are several kinds of ciphers, according to lord Bacon; as the simple, those mixed with non-significants, those consisting of two kinds of characters, wheel-ciphers, key-ciphers, word-ciphers, &c. They ought all to have these three properties, 1. They should be easy to write and read. 2. They should be trusty and undecipherable. 3. Clear of suspicion.

There is a new way of eluding the examination of a cipher, viz. to have two alphabets,

the one of significant, and the other of non-significant letters; and folding up two writings together, the one containing the secret, while the other is such as the writer might probably send without danger: in case of a strict examination, the bearer is to produce the non-significant alphabet for the true, and the true for the non-significant; by which means the examiner would fall upon the outward writing, and finding it probable, suspect nothing of the inner. No doubt the art of ciphering is capable of great improvement. It is said that king Charles I. had a cipher consisting only of a straight line differently inclined: and there are ways of ciphering by the mere punctuation of a letter, whilst the words of a letter shall be non-significants, or sense that leaves no room for suspicion. Those who desire a fuller explanation of ciphering may consult Bacon in his Advancment of Learning, where they will find a cipher of his invention; bishop Wilkins' Secret and Swift Messenger; and Mr. Falconer's Cryptomenysis Patefacta. See also, Kircher's Steganography, Bacon's Remains, &c.

To CI'PHER. *v. n.* (from the noun.) To practise arithmetick (*Arbuthnot*).

To CI'PHER. *v. a.* To write in occult characters (*Hayward*).

CIPHERING, or CYPHERING, is popularly used for the art of accompting; properly called arithmetic.

CIPPI, in antiquity, a kind of stocks used among the Romans: they were large pieces of wood, which not only loaded the legs of prisoners, but sometimes distended them in a very painful manner. The stocks mentioned in Acts xvi. 24, in which Paul and Silas were secured, were probably of this kind. See *Grotius* and *Doddridge in loc.*

CIPPUS, in antiquity, a low column, with an inscription, erected on the high roads, or other places, to show the way to travellers; to serve as a boundary; to mark the grave of a deceased person, &c.

CIRCÆA. Enchanters nightshade. In botany, a genus of the class diandria, order monogynia. Corol two-petalled; calyx two-leaved superior: capsule two-celled, not opening; the cells one-seeded. Two species; both natives of our own country.

1. C. lutetiana: with stem erect; leaves ovate, denticulate, opake, pubescent; found in shady lanes.

2. C. alpina: with stem ascending; leaves heartshaped, serrate, polished; calyx membranaceous: found in shady woods.

CIRCARS, a name given in Hindustan to tracts of country, not very dissimilar in point of magnitude to the counties in England. Thus we read of the northern Circars, being those which lie to the north of the Carnatic.

CIRCASSIA, a country of Asia, bounded on the north by the river Don, on the east by the Caspian sea and the mouths of the Volga, on the south by mount Caucasus and the Black sea, and on the west by part of the Black sea and the lake of Azoph. It was formerly governed by several independent princes, but is now almost wholly subject to Russia, and included in the government of Caucasus. The Circassians are in general well made, and excellent horsemen; the women usually very handsome. Their principal traffic is in slaves, honey, wax, skins of cattle, deer, and tigers. They have no money, and all their commerce is by exchange. The Circassians were formerly Christians; but for want of instruction and written laws they have now sunk down into a bare profession of Mahometanism. Their food is very simple; and some of their customs curious, but we cannot here describe them without curtailing other articles of greater importance.

CIRCE, in fabulous history, a daughter of Sol and Perseis, celebrated for her skill in magic and venomous herbs, married a Sarmatian prince of Colchis, whom she murdered to obtain the kingdom. She was expelled by her subjects, and carried by her father upon the coasts of Italy, in an island called Æa. Ulysses, at his return from the Trojan war, visited her coasts; and all his companions, who ran headlong into pleasure and voluptuousness, were changed by Circe's potions into swine. Ulysses, who was fortified against all enchantments by an herb called *moly*, which he had received from Mercury, went to Circe, and demanded the restoration of his companions to their former state. She complied, and loaded the hero with pleasures and honours. For one whole year, Ulysses forgot his glory in Circe's arms. At his departure, the nymph advised him to descend to hell, and consult the manes of Tiresias, concerning the fates that attended him. Circe shewed herself cruel to Scylla, her rival, and to Picus. See SCYLLA and PICUS. (*Ovid. Virgil.* &c.)

CIRCENSES LUDI, CIRCENSIAN GAMES, or GAMES OF THE CIRCUS, a general term, under which were comprehended all combats exhibited in the Roman circus, of what kind soever; whether on foot, or horseback, or in a car; wrestling, or boxing; with swords, pikes, darts, or arrows; against men, or against beasts; on the ground, or aboard vessels.

CIRCINAL VERNATION. In botany. Quum folium in spiram transversalem coarctatum sit; ut apex centrum obtineat. Delin. Pl.—Circinalia folia, quum deorsum spiraliter involvuntur. Philos. Bot.—A term in foliation or leafing; importing that the leaves are rolled in spirally downwards, the tip occupying the centre. As in ferns, and some palms.—For circinal we may use the word spiral, which scarcely however expresses the idea.

To CI'RCINATE. *v. a.* (*circino*, Lat.) To make a circle; to compass round (*Bailey*).

CIRCINA'TION. *s.* (*circinatio*, Lat.) An orbicular motion; a turning round (*Bailey*).

CIRCINUS, in astronomy, the compasses, a new southern constellation. It consists of 0. 0. 0. 1. 2. 3., in all 6 stars of the first six magnitudes.

CIR'CLE. *s.* (*circulus*, Latin.) 1. A line

continued till it ends where it begun, having all its parts equidistant from a common centre (*Locke*). 2. The space included in a circular line. 3. A round body; or orb (*Isaiah*). 4. Compass; enclosure (*Shakspeare*). 5. An assembly surrounding the principal person (*Pope*). 6. A company; an assembly (*Addison*). 7. Any series ending as it begins, and perpetually repeated (*Dryden*). 8. An inconclusive form of argument, in which the foregoing proposition is proved by the following, and the following proposition inferred from the foregoing (*Watts*). 9. Circumlocution; indirect form of words (*Fletcher*).

To CI'RCLE. *v. a.* (from the noun.) 1. To move round any thing (*Bacon*). 2. To enclose; to surround (*Prior*). 3. *To Circle in.* To confine; to keep together (*Digby*).

To CI'RCLE. *v. n.* To move circularly; to end where it begins (*Pope*).

CIRCLE, in geometry, a plane figure bounded by a curve line which returns into itself, called its circumference, and which is every where equally distant from a point within, called its centre.

The circumference or periphery itself is called the circle, though improperly, as that name denotes the space contained within the circumference.

A circle is described with a pair of compasses, fixing one foot in the centre, and turning the other round to trace out the circumference.

The circumference of every circle is supposed to be divided into 360 equal parts, called degrees, and marked ^{0}; each degree into 60 minutes or primes, marked $'$; each minute into 60 seconds, marked $''$; and so on. So $24^0\ 12'\ 15''\ 20'''$, is 24 degrees 12 minutes 15 seconds and 20 thirds.

Circles have many curious properties, some of the most important of which are these:

1 The circle is the most capacious of all plane figures, or contains the greatest area within the same perimeter, or has the least perimeter about the same area; being the limit and last of all regular polygons, having the number of its sides infinite.

2. The area of a circle is always less than the area of any regular polygon circumscribed about it, and its circumference always less than the perimeter of the polygon. But on the other hand, its area is always greater than that of its inscribed polygon, and its circumference greater than the perimeter of the said inscribed polygon. However, the area and perimeter of the circle approach always nearer and nearer to those of the two polygons, as the number of the sides of these is greater; the circle being always limited between the two polygons.

3. The area of a circle is equal to that of a triangle whose base is equal to the circumference, and perpendicular equal to the radius. And therefore the area of the circle is found by drawing half the circumference into half the diameter, or the whole circumference into the whole diameter, and taking the fourth part of the product. Demonstrated by Euclid.

4. Circles, like other similar plane figures, are to one another, as the squares of their diameters. And the area of the circle is to the square of the diameter, as 11 to 14 nearly, as proved by Archimedes; or as ·7854 to 1 more nearly; or still more nearly as

·7853981633,9744830961,5660845819,8757210492, 9234984377,6455243736,1480769541,0157155224, 9657008706,3355292669,9553702162,8318076661, 7734611 + to 1;

as it has been found by modern mathematicians.

5. The circumferences of circles are to one another, as their diameters, or radii. And as the areas of circles are proportional to the rectangles of their radii and circumferences; therefore the quadrature of the circle will be effected by the rectification of its circumference; that is, if the true length of the circumference could be found, the true area could be found also.

The approximate quadrature of the circle, or the determination of the ratio between the diameter and the circumference, is what the mathematicians of all ages have successfully attempted, and with different degrees of accuracy, according to the improved state of the science. Archimedes, in his book de Dimensione Circuli, first gave a near value of that ratio in small numbers, being that of 7 to 22, which are still used as very convenient numbers for this purpose in common measurements. Other and nearer ratios have since been successively assigned, but in larger numbers,

as 106 to 333,
or 113 to 355,
or 1702 to 5347,
or 1815 to 5702, &c.

which are each more accurate than the foregoing. Vieta, in his Universalium Inspectionum ad Canonum Mathematicum, published 1579, by means of the inscribed and circumscribed polygons of 393216 sides, has carried the ratio to ten places of figures, shewing that if the diameter of a circle be 1000 &c. the circumference will be

greater than 314,159,265,35,
but less than 314,159,265,37.

And Van Colen, in his book de Circulo & Adscriptis, has, by the same means, carried that ratio to 36 places of figures; which were also recomputed and confirmed by Willebrord Snell. After these, that indefatigable computer, Mr. Abraham Sharp, extended the ratio to 72 places of figures, in a sheet of paper, published about the year 1706, by means of the series of Dr. Halley, from the tangent of an arc of 30 degrees. And the ingenious Mr. Machin carried the same to a hundred places, by other series, depending on the differences of arcs whose tangents have certain relations to one another. See this method explained in Hutton's Mensuration, p. 120, second edit. And, finally, M. De Lagny, in the Memoirs de l'Acad. 1719, by means of the tangent of the arc of 30 degrees, has extended the same ratio to the amazing length of 128 places of

figures; finding, that, if the diameter be 1000 &c. the circumference will be

31415,92653,58979,32384,62643,38327,95028,
84197,16939,93751,05820,97494,45923,07816,
40628,62089,98628,03482,53421,17067,98214,
80865,13272,30664,70938,446 + or 447—

For an entertaining account of the different attempts made to obtain the quadrature of the circle, see the new edition of Ozanam's Recreations, vol. i. p. 353, &c. or Histoire des Mathematiques, vol. iv. p. 619, &c. And for the more curious and useful properties of the circle, consult Euclid's Elements, book iii. and the best authors on geometry, as Simpson, Emerson, Hutton, Bonnycastle, Legendre, &c. Legendre has shewn in his Geometry, p. 286—293, that the ratio of the circumference to the diameter, and the square of that ratio, are irrational numbers.

Circles of the higher Orders, are curves, the properties of which are expressed by the following equations.

$$x^m : y^m :: y : \overline{a-x}, \text{ or } y^{m+1} = x^m \overline{a-x}$$

$$x^m : y^m :: y^n : \overline{a-x}^n, \text{ or } y^{m+n} = x^m \overline{a-x}^n$$

where a is the axis, x the absciss, and y the ordinate. Curves defined by this equation will be ovals when m is an odd number. But when m and n are each equal to 1, the equation becomes that of the common circle.

Circle of Curvature, in geometry, that circle the curvature of which is equal to that of any curve at a certain point. It is also called the circle of equi-curvature.

Circles of the Sphere, such as cut the mundane sphere, and have their circumference in its surface. They are either moveable, or fixed. The first, those whose peripheries are in the moveable surface, and which therefore revolve with its diurnal motion; as, the meridians, &c. The latter having their periphery in the immoveable surface, do not revolve; as the ecliptic, equator, and its parallels, &c.

The circles of the sphere are either great or little.

A great Circle of the Sphere, is that which divides it into two equal parts or hemispheres, having the same centre and diameter with it. As the horizon, meridian, &c.

A little, or less Circle of the Sphere, divides the sphere into two unequal parts, having neither the same centre nor diameter with the sphere; its diameter being only some chord of the sphere less than its axis. Such as the parallels of latitude, &c.

Circles of Altitude. See ALMUCANTARS.

Circles of Declination, are great circles intersecting each other in the poles of the world.

Diurnal Circles, are parallels to the equinoctial, supposed to be described by the stars, and other points of the heavens, in their apparent diurnal rotation about the earth.

It may here be observed, that most circles of the sphere are transferred from the heavens to the earth; and so come to have a place in geography, as well as in astronomy; all the points of each circle being conceived as let fall perpendicularly on the surface of the terrestrial globe, and thus tracing out circles perfectly similar to them. Thus the terrestrial equator is a circle conceived precisely under the equinoctial line, which is in the heavens: and so of the rest.

Circles of Excursion, are circles parallel to the ecliptic, and at such a distance from it, as that the excursions of the planets towards the poles of the ecliptic may be included within them; usually fixed at ten degrees.

Circles, horary, in dialling, are the lines which shew the hours on dials; though these be not drawn circular, but nearly strait.

Circle, horary, on the Globe, a brazen circle fixed to the north pole, and furnished with an index, shewing the difference of meridians, and serving for the solution of many problems. On globes of late structure, this circle is often placed on the equator, and the index is made to slide on a brass wire running parallel to the equator, and above it.

Circle of Illumination, a circle passing through the centre of the earth or moon, perpendicular to a line drawn from the sun to the respective body. This is supposed to separate the illuminated part of the globe from the darkened part; and indeed it does so, very nearly.

Circles of Latitude, or Secondaries of the Ecliptic, are great circles parallel to the plane of the ecliptic, passing through the poles thereof, and through every star and planet. They are so called, because they serve to measure the latitude of the stars, which is nothing but an arch of one of these circles intercepted between the star and the ecliptic.

Circles of Longitude, are several less circles, parallel to the ecliptic; still diminishing, in proportion as they recede from it. On the arches of these circles the longitude of the stars is reckoned.

Circle of perpetual Apparition, one of the less circles, parallel to the equator; described by any point of the sphere touching the northern point of the horizon; and carried about with the diurnal motion. All the stars included within this circle never set, but are ever visible above the horizon.

Circle of perpetual Occultation, is another circle at a like distance from the equator; and contains all those stars which never appear in our hemisphere. The stars situated between these circles alternately rise and set at certain times.

Polar Circles, are immoveable circles, parallel to the equator, and at a distance from the poles equal to the greatest declination of the ecliptic. See ARCTIC and ANTARCTIC.

Circles Reflecting. See CIRCULAR INSTRUMENTS.

Circles vertical. See AZIMUTH.

CIRCLES (Druidical), in British topography, a name given to certain ancient inclosures, formed by rude stones, circularly arranged.

These, it is now generally agreed, were temples, and many writers think also places of solemn assemblies for councils or elections, and seats of judgment. These temples, though generally circular, occasionally differ as well in

figure as magnitude: with relation to the first, the most simple were composed of one circle. Stonehenge consisted of two circles and two ovals, respectively concentric; whilst that at Bottalch near St. Just in Cornwall is formed by four intersecting circles. The great temple at Abury in Wiltshire, it is said, described the figure of a seraph or fiery flying serpent, represented by circles and right lines. Some, besides circles, have avenues of stone pillars. Most, if not all of them, have pillars or altars within their penetralia or centre. In the article of magnitude and number of stones, there is the greatest variety; some circles being only twelve feet diameter, and formed only of twelve stones; whilst others, such as Stonehenge and Abury, contained, the first one hundred and forty, the second six hundred and fifty-two, and occupied many acres of ground. All these different numbers, measures, and arrangements, had their pretended reference, either to the astronomical divisions of the year, or some mysteries of the druidical religion.

CI'RCLET. *s.* (from *circle.*) A circle; an orb: properly a little circle (*Pope*).

CI'RCLING. *part. a.* Circular; round (*Milton*).

CIRCOCELE. (*circocele*, κιρσοκηλη, from κιρσος, varix, or a dilatation of a vein, and κηλη, a tumour.) In surgery. Varicocele. An enlargement of the veins of the spermatic cord.

Varicocele, however, is a barbarous and illegitimate term for the disease, as being compounded of two different languages: the proper term is cirsocele, of which circocele is only a corruption.

CIRCON EARTH. In mineralogy, zircon, jargon: a peculiar species of earth indigenous to Ceylon. See CIRCONIUS.

CIRCONIUS. Circon; zircon; jargon. In oryctology, a genus of the class earths, order siliceous; consisting of silica, a more than double portion of circonia, and a very small quantity of metallic oxyd, partly of iron, partly of nickel; very hard, ponderous; imitating the diamond in its lustre; parasytical, foliated with the foliations incurved crystallised; not fusible by itself. One species only: found in Ceylon in small irregular grains, or crystallised in quadrangular, rectangular prisms, terminated on each side by a quadrangular pyramid, or in double quadrangular pyramids. Colour grey, greenish, yellowish-brown, reddish-brown, or violet; is strongly semitransparent, sometimes opake; scratches glass; and is not altered by the heat in which the diamond is consumed. Specific gravity 4.416: contains

Zirconia	68.0
Silica	31.5
Nickel and iron	5
	100.0

CI'RCUIT. *s.* (*circuit*, Fr. *circuitus*, Lat.) 1. The act of moving round any thing (*Watts*). 2. The space enclosed in a circle (*Milton*). 3. Space or extent, measured by travelling round (*Hooker*). 4. A ring, a diadem (*Shakspeare*).

CIRCUIT (Electrical), denotes the course of the electric fluid from the charged surface of an electric body, to the opposite surface, into which the discharge is made. Some electricians at first apprehended, that the same particles of the electric fluid that were thrown on one side of the charged glass, actually made the whole circuit of the intervening conductors, and arrived at the opposite side: whereas Dr. Franklin's theory only requires, that the redundancy of electric matter on the charged surface should pass into those bodies which form that part of the circuit which is contiguous to it, driving forward that part of the fluid which they naturally possess; and that the deficiency of the exhausted surface should be supplied by the neighbouring conductors, which form the last part of the circuit. On this supposition, a vibrating motion is successively communicated through the whole length of the circuit.

Many attempts were made, both in France and England, at an early period in the practice of electricity, to ascertain the distance to which the electric shock might be carried, and the velocity of its motion. The result was that the electric matter might, at least, be conveyed through a circuit of four miles, and that the motion was too rapid to admit of measurement.

CIRCUIT, in law, signifies a longer course of proceedings than is needful to recover the thing sued for; in case a person grants a rent-charge of 10*l.* a year out of his manor, and afterwards the grantee disseises the grantor, who thereupon brings an assise, and recovers the land, and 20*l.* damages; which being paid, the grantee brings his action for 10*l.* of the rent, due during the time of the disseisin; this is termed circuity of action, because as the grantor was to receive 20*l.* damages, and pay 10*l.* rent, he might only have received the 10*l.* for the damages, and the grantee might have retained the other 10*l.* for his rent, and by that means saved his action.

CIRCUIT also signifies the journey, or progress, which the judges take twice every year, through the several counties of England and Wales, to hold courts and administer justice, where recourse cannot be had to the king's courts at Westminster; hence England is divided into six circuits, viz. the home circuit, Norfolk circuit, midland circuit, Oxford circuit, western circuit, and northern circuit. In Wales there are but two circuits, North and South Wales. Two judges are assigned by the king's commission to every circuit. In Scotland there are three circuits, viz. the southern, western, and northern, which are likewise made twice every year, viz. in spring and autumn.

To CI'RCUIT. *v. n.* To move circularly.

CIRCUITE'ER. *s.* (from *circuit.*) One that travels a circuit (*Pope*).

CIRCUI'TION. *s.* (*circuitio*, Latin.) 1. The act of going round any thing. 2. Compass; maze of argument (*Hooker*).

CI'RCULAR. *a.* (*circularis*, Latin.) 1. Round, like a circle; circumscribed by a circle (*Addison*). 2. Successive in order; always returning. 3. Vulgar; mean; circumforaneous (*Dennis*). 4. Ending in itself (*Baker*).

Circular instruments of reflection, or Multiplying circles, are instruments in which the advantages of large instruments in diminishing the errors of division and eccentricity are procured at pleasure by reflection, though the instruments themselves are small and portable.

Circular instruments are, in fact, considerable improvements upon Hadley's octant, and the marine sextant, devised for the same purpose. We shall here describe the progress of these instruments under the hands of Tobias Mayer, Borda, and captain Mendoza Rios.

Mr. Mayer proposed to complete the limb of the sextant, making a whole circle, with the horizon glass moveable round the centre, with an additional index, which we shall call the horizon index, in order to distinguish it from the centre index, to which the centre glass is attached. This instrument is represented in Plate 41. fig. 1; and the manner of using it is as follows: after the index A is set at 0, (the beginning of the divisions), the two glasses are rendered parallel, as is usually practised with Hadley's quadrant, by moving the horizon index B, till the horizon of the sea (or the sun, or any other object), or its direct image, and the doubly reflected image of the same, seen through the telescope, coincide. After fixing the horizon index in that position, the centre index A is to be moved, in order to measure the distance of the two objects S and L (suppose the sun and moon), by bringing into contact the doubly reflected image of the sun with the direct image of the moon, seen through the telescope. The centre image will then be at M, and the arch 0 M might give, as in the sextant, the angular distance required; but the construction of the circle renders it easy, in this position, to effect again the parallelism of the glasses, and to make another observation of the contact, in the like manner as from 0; which operation will bring the centre index to N. The index will then give 0 N, or double the distance; and, as it must be divided by 2, in order to have the angle required, the errors of division and eccentricity, which, together, we call the error of the instrument, will be likewise reduced to one half. It is obvious, that by successive repetitions of the same process, triple, quadruple, &c. the distance may be obtained, and the said error further reduced, in the inverse ratio of the multiplication of the distance, to any degree of approximation required.

The method of rendering the glasses parallel, by means of the horizon of the sea, is not accurate, on account of the indistinctness of the images; and, when the sun is used for that purpose, the observation becomes fatiguing to the eye. The repetition of that observation, by one or the other method, remained therefore a considerable inconvenience attached to Mr. Mayer's circle. The author himself seems to have been of that opinion, as he proposed to provide the instrument with a diagonal rule, fixed upon one of the indexes, so that the other index should touch it when the glasses were parallel; but an adjustment of this nature must be subject to great errors, and was never adopted in practice. The chevalier de Borda, wishing to remove that imperfection, had the happy idea of rendering the parallelism of the glasses unnecessary, by substituting the observation of the angular distance of the two objects, to that of the coincidence of the images of the same object. This constitutes the second great improvement of the reflecting circle.

In Borda's circle, the telescope is fixed at some distance from the centre, and the horizon glass is carried near the border of the instrument, as in Plate 41. fig. 2. By this arrangement, the rays of light can arrive at the centre glass, both from the heavenly bodies situated to the right of the horizon index, as S′, and from those situated to the left, as S. Thus, if the glasses are parallel to one another, when the centre index is at 0, it is obvious that there are two ways of making the observations. While the direct image of the moon L is seen through the telescope, the angular distance to the sun, if at S, may be measured by moving the centre index to *m*, in order to produce the contact; or, if the sun is at S′, the same operation may be performed, by using the contrary motion to *m*′. The first kind of observation, the chevalier de Borda calls observation to the left; and the second, observation to the right. Suppose now, that (the horizon index being fixed in the same position) the distance from L to S is observed to the left, by bringing into contact the doubly reflected image of S with the image of L, seen without reflection; let us then turn the instrument round, keeping it in the same plane, so as to have the direct image of S through the telescope, and thus make an observation of the same distance to the right; the position of the centre index being in the first observation at *m*, and in the second observation at *m*′, it is clear, that if 0 is the point where the parallelism of the glasses takes place, 0 *m* is equal to 0 *m*′; and, that the arch *m m*′, determined by the two positions, will give double the distance.

It will be more convenient to have the centre index at 0, when the first observation is made, in order to take the double distance at one reading, after the second observation. For this purpose, the first part of the process may be inverted, by previously fixing the centre index at the beginning of the divisions, and moving the horizon index H towards 0, instead of moving the centre index A to *m*, or towards H.

The last kind of observation, in which the incident ray, which produces the first image upon the centre glass, may be conceived to run double the angular distance, passing in its way over the line of collimation, has been called, by the chevalier de Borda, the crossed observation.

The same process may be repeated, by fixing alternately one of the indexes, and moving the other, and continuing successive sets of observations; each set of two crossed observations, one to the right and another to the left. The angle given by the instrument, will be equal to

Fig. 1.

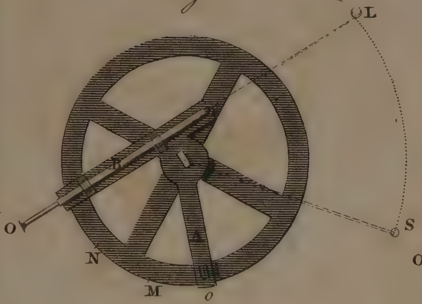
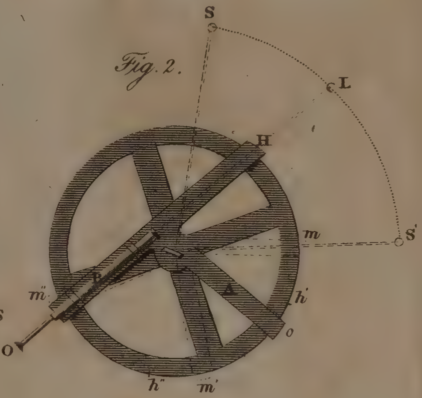


Fig. 2.



Mendoza's New Circular Instrument.

Mutlow Sc. Russell Ct.

Published by G. Kearsley, Fleet Street, Jan.y 1st 1809.

double the angular distance multiplied by the number of sets observed, or, in other terms, to the angular distance multiplied by the number of observations, which are always supposed to be made by pairs; an odd observation being of no value in this manner of using the circle.

We have expressed ourselves as if the observations could always be made by looking alternately at each object through the telescope, in order to bring into contact the doubly reflected image of the other object. This is not the case in the observations of the distances from the moon to the sun, or a star; it being then indispensable to compare, by reflection, the brightest of the two heavenly bodies; but there is a very easy method of obviating that inconvenience. After the contact of the images of S and L is observed, with the telescope directed to L, the position of the plane of the instrument may be inverted, turning it round the axis of vision O B L; the incident ray will then answer to the point S′, equally distant from L as S, and the crossed observations will still give S S′, or double the distance.

Whether a circle is used simply, as Mayer proposed it, or according to Borda's method, its peculiar advantages chiefly depend on the multiplication of the distance required. Captain Mendoza has therefore turned his attention to the improvement of this principle; and, with that view, has contrived the construction which we next describe.

In the crossed observations made with Borda's circle, the indexes move alternately through an arch which in the divisions, is equal to double the distance: for example, the centre index comes, in the first crossed observation, from m' to m'; in the third crossed observation, from m' to m'', &c. and the horizon index, in the second crossed observation, to h': in the fourth crossed observation, to h'', &c. and by each of the two indexes may be found the same multiple of the distance required. Let us now place the nonius in a circle moving round the centre, over, or adjacent to, the usual limb which contains the divisions: it will easily be conceived, that, by attaching that circle, which captain Mendoza calls the flying nonius, alternately to each of the indexes, it will serve as nonius for both; and that, after any number of observations, it will give the compound motion of the two indexes. Thus, after the first observation, the flying nonius will, at each crossed observation, advance double the distance over the divisions, while each separate nonius, fixed on the indexes, requires a set of two observations, to produce the same effect in Borda's circle.

The lower part of Plate 41, exhibits a perspective view of the improved reflecting circle. M is the divided limb of the circle, and N the flying nonius, to each of which the horizon index may be occasionally attached, by means of the clamps D, C; as well as the centre index, by means of the other clamps, A, B. The peculiar property of the instrument being that of giving double the distance, it was thought proper to divide the circle into 360 degrees, and not into 720 according to the nature of the sextant. Thus, after a crossed observation, the reading of the nonius will, without reduction, exhibit the measure of the simple distance. Captain Mendoza has likewise extended the nonius round the circumference, so that, by the coincidence of two divisions, the number of degrees will appear on the limb, and that of the minutes and seconds on the flying nonius. The manner of making the observations with this instrument is as follows:

Adapt the 0 of the flying nonius to 360° of the limb; and then fasten the two clamps A, B, of the centre index E E, by which the divisions will be kept in the same relative situations. Then turn round the horizon index F F, and make an observation of the distance to the right. The contact must be adjusted by the screw G, the clamp C being fastened. Leave this clamp fastened, and loosen the clamp A; thus turn the instrument, and make a crossed observation to the left, adjusting by means of the screw H, after having fastened the clamp D. At the end of this observation, the flying nonius will give the distance. Fasten now the clamp A, and loosen the clamps B and C, leaving the clamp D fastened; then turn the instrument again, and make a crossed observation to the right. At the end of this observation, the flying nonius will give double the distance. By successively inverting the use of the clamps, this alternate process may be continued ad libitum; and each crossed observation will increase the reading, by an arch equal to the distance.

Let the number of observations be n, and the angular distance D. The arch given by the improved circle will be $= D\ (n - 1)$. In Borda's circle, (reducing the divisions of the sextant to those of the theodolite captain Mendoza uses) the arch is $= D \times \frac{1}{2}\, n$; and, either n must be an even number, or the odd observation must be lost. In Mayer's circle, the arch is $= \frac{1}{2} D \times \frac{1}{2} n$; and the number n, which comprehends the observations for the parallelism of the glasses and those for the distance, must likewise be even. The comparison of these expressions, shews at once the relative advantages of the different instruments.

This construction offers considerable advantages, in every manner of using the circle. If, instead of the crossed observations, it should be wanted to employ the usual practice of rendering the glasses parallel, a multiple of the distance may still be obtained by capt. M.'s instrument, equal to that of the other method. For this purpose, the parallelism of the glasses may be effected, by means of the images of the sun, or the horizon of the sea, moving the index F, while the 0 of the nonius is adapted to 360° of the limb, and the two clamps A, B, are fastened. After this, an observation of the distance to the right may be made, with the clamp A fastened, while the clamp B is loose; the clamp D being also fastened, and the clamp C loose; and, at the end of this observation, the flying nonius will give an angle, which will be only the half of the distance in capt. M.'s divisions, but

which would be equal to the whole distance, if the divisions were according to the sextant. After that, and while the clamps B and C are fastened, and the clamps A and D loose, the parallelism of the glasses may be again effected; and the nonius will advance the same quantity over the limb. The same addition will take place, by inverting the use of the clamps, and making another observation of the distance. The like alternate process may be continued indefinitely; and the result given by the instrument will, with only one observation more, be the same as that of Borda's method, and double the arch which would be obtained by Mayer's circle.

Mr. Borda's circle is liable to a very great inconvenience in practice. Each index advances successively over the limb; and, in order to facilitate the operation of bringing the images for the contact within the telescope, that author advises to make a preparatory memorandum of the positions which the indexes will nearly occupy, so that they may be set accordingly, previous to each observation. But this method, which is always inconvenient, by night becomes almost impossible. For this reason, captain Mendoza has joined to the horizon index an arch L L, which is divided, both to the right and left, into degrees and minutes of the sextant, so that, when the glasses are parallel, the centre index coincides with the two first divisions 0, 0, and occupies the space left blank between them. He has further provided two sliding pieces P, P, which may be adapted to that arch, with a spring sufficient to keep them firm in any situation. Putting each of these pieces upon the arch, so that their ends may coincide with the divisions marking the rough distance to be measured, no more will be required than to set the centre index alternately against each piece, before the beginning of the successive crossed observation. The clamp may then be fastened, and the remainder of the motion produced by the adjusting screw; as, if necessary, the index will push the sliding piece further, and leave it at the point where the contact was effected.—The idea of this simple contrivance, was suggested by the ingenious Mr. E. Troughton.

The flying circle facilitates the use of any number of noniuses, which may be applied round the whole circumference; but, as the leading principle chiefly had in contemplation, is that of obtaining an accurate result from one reading, only a single nonius is used. Two noniuses, opposite one another, might however be advantageous, in order to correct the errors of eccentricity; but a greater number ought not, in any case, to be used.

This improvement may be partially applied to a circle, where the telescope and the horizon glass are attached, or fixed, to the main frame of the instrument. The flying nonius, acting then with the single centre index, will only give the same result as Borda's circle; but this construction seems greatly preferable to all the other plans executed till now; the whole apparatus being more solid and simple, and its use not liable to the errors which arise from the motion of the horizon index.

With this construction, we may likewise employ a method of ascertaining the place where the parallelism of the glasses was observed to take place, and of setting the index afterwards in the same situation, as often as is necessary for the repetition of the observations. A piece may be used, so contrived as to be attached to, or detached from, one side of the index, by means of a screw; and provided besides with other screws, to fasten it to any part of the limb. This rectification piece, being previously attached to, and carried with, the index, must be fixed in the situation it occupied when the contact of the images was observed. The index will then be detached from it, in order to observe the distance, and afterwards must be brought back to the same position as before, contiguous to the rectification piece. The like alternate process may be repeated; and the flying nonius, going with the index in the motions forwards, and standing still in the motions backwards, will give the multiple of the observed angle, without performing the observation for the parallelism more than once in the beginning. In Mayer's circle, as well as in Borda's, there is a great objection to any attempt for that purpose; because, as the horizon glass moves round with the index, its perpendicular position is deranged by the inequalities of the plane of the limb; but in this construction for multiplying with the horizon glass fixed, that inconvenience is removed; and the method of ascertaining the identical position of the glasses may be employed in practice, with advantage, it being done when the index is at the same point of the frame. By suggesting this idea, we do not, however, mean to represent it as preferable to the repetition of the observations; which process must, for many reasons, have the advantage over any mechanical contrivance whatsoever. (*Phil. Trans.* 1801).

For more on the nature of circular instruments of reflection, see Montucla, Histoire des Mathematiques, tom. iii. p. 527: for the computation of the probable extent of the errors to which they are liable, see Svanberg, Exposition des Opérations faites en Lapponiè pour la Determination d'un arc du Méridien, p. 29—34: and for a catalogue of papers, &c. connected with such instruments, consult Dr. T. Young's Natural Philosophy, vol. ii. p. 350—352.

Circular lines, in mathematics, such straight lines as are divided from the divisions made in the arch of the limb, such as sines, tangents, secants, chords, &c.

Circular numbers, called also spherical ones, according to some are such whose powers terminate in the roots themselves. Thus, for instance, 5 and 6, all whose powers do end in 5 and 6, as the square of 5 is 25, the square of 6 is 36, &c.

Circular parts (Napier's), are five parts of a right-angled or a quadrantal spherical triangle; they are the two legs, the comple-

ment of the hypothenuse, and the complements of the two oblique angles.

Concerning these circular parts, Napier gave a general rule in his Logarithmorum Canonis Descriptio, which is this; "The rectangle under the radius and the sine of the middle part, is equal to the rectangle under the tangents of the adjacent parts, and to the rectangle under the confines of the opposite parts. The right angle or quadrantal side being neglected, the two sides and the complements of the other three natural parts are called the circular parts; as they follow each other as it were in a circular order. Of these, any one being fixed upon as the middle part, those next it are the adjacent, and those farthest from it the opposite parts." Lord Buchan's Life of Napier, p. 98.

This rule contains within itself all the particular rules for the solution of right-angled spherical triangles, and they were thus brought into one general comprehensive theorem, for the sake of the memory; as thus, by charging the memory with this one rule alone, all the cases of right-angled spherical triangles may be resolved, and those of oblique ones also, by letting fall a perpendicular, excepting the two cases in which there are given either the three sides, or the three angles. If the reader attend to the circumstance of the second letters of the words tangents and cosines being the same with the first of the words adjacent and opposite, he will find it almost impossible to forget the rule. And the rule for the solution of the two cases of spherical triangles, for which the former of itself is insufficient, may be thus expressed: of the circular parts of an oblique spherical triangle, the rectangle under the tangents of half the sum and half the difference of the segments at the middle part (formed by a perpendicular drawn from an angle to the opposite side), is equal to the rectangle under the tangents of half the sum and half the difference of the opposite parts. By the circular parts of an oblique spherical triangle are meant its three sides and the supplements of its three angles. Any of these six being assumed as a middle part, the opposite parts are those two of the same denomination with it, that is, if the middle part is one of the sides, the opposite parts are the other two, and, if the middle part is the supplement of one of the angles, the opposite parts are the supplements of the other two.

Mr. Walter Fisher has given, in the Transactions of the Royal Society of Edinburgh, rules somewhat analogous to these of Napier's, which will serve for the solution of all the cases of plane and spherical triangles.

"A principal recommendation of these rules is, that they rid trigonometry of all ambiguity, so far as it can be effected, and that they are particularly useful in the solution of spherical oblique triangles. To apply them to plane triangles, instead of the sine or tangent of a side, take the side itself. That they may be more easily remembered, the following words formed from the abbreviation of the terms of the properties should be committed to memory; *sao satom, tao, sarsalm.*

Theor. 1. Given two parts and an opposite one.

$$\text{S.A} : \text{S.O} :: \text{S.}a : \text{S.o}.$$

Theor. 2. An included part given or sought.

$$\text{S.}\frac{\text{A}-a}{2} : \text{S.}\frac{\text{A}+a}{2} :: \text{T.}\frac{\text{O}-\text{o}}{2} : \text{T.}\frac{\text{M}}{2}$$

Theor. 3.

$$\text{T.}\frac{\text{A}-a}{2} : \text{T.}\frac{\text{A}+a}{2} :: \text{T.}\frac{\text{O}-\text{o}}{2} : \text{T.}\frac{\text{O}+\text{o}}{2}$$

Theor. 4. Given the three sides or angles of an oblique angled triangle.

$$\text{S.A} \times \text{S.}a : \text{R}^2 :: \text{S.}\frac{\overline{\text{A}+a}+l}{2} \times \text{S.}\frac{\overline{\text{A}+a}-l}{2} : \text{S.}\frac{\text{M}^2}{2}.$$

"M denotes the middle part of the triangle, and must always be assumed between two given parts. It is either a side or the supplement of an angle, and is sometimes given, sometimes not.

"A and a are the two parts adjacent to the middle, and of a different denomination from it.

"O and o denote the two parts opposite to the adjacent parts, and of the same denomination with the middle part.

"l is the last or most distant part, and of a different denomination from the middle part."

CIRCULAR SAILING, the method of navigating a ship upon a great circle of the globe. See NAVIGATION.

CIRCULAR LETTER. A letter directed to several persons, who have the same interest in some common affair, or all of whom are requested to promote one common concern.

CIRCULA'RITY. *s.* (from *circular*.) A circular form (*Brown*).

CI'RCULARLY. *ad.* (from *circular.*) 1. In form of a circle (*Burnet*). 2. With a circular motion (*Dryden*).

To CI'RCULATE. *v. n.* (from *circulus.*) 1. To move in a circle (*Denham*). 2. To be dispersed (*Addison*).

To CI'RCULATE. *v. a.* To put about (*Swift*).

CIRCULATING DECIMALS, are produced from vulgar fractions whose denominators do not measure their numerators, and are distinguished by the continual repetition of the same figures.

1. The circulating figures are called repetends; and if one figure only repeats, it is called a single repetend; as .1111, &c. 3333, &c.

2. A compound repetend hath the same figures circulating alternately; as .010101, &c.; .123123,123, &c.

3. If other figures arise before those that circulate, the decimal is called a mixed repetend; thus, .283333, &c. is a mixed single repetend, and .573.21321, &c. a mixed compound repetend.

4. A single repetend is expressed by writing only the circulating figure with a point over it: thus .1111, &c. is denoted by $.\dot{1}$, and .333, &c. by $\dot{3}$.

5. Compound repetends are distinguished by putting a point over the first and last repeating figure; thus, .0101, &c. is written $.\dot{0}\dot{1}$, and .123123, &c. $.\dot{1}2\dot{3}$.

6. Similar circulating decimals are such as consist of the same number of figures, and begin at the same place, either before or after the decimal point; thus $.\dot{2}$ and $.\dot{3}$ are similar circular circulates, as are also $2.\dot{3}\dot{4}$ and $3.\dot{7}\dot{6}$, &c.

7. Dissimilar repetends consist of an unequal number of figures, and begin at different places.

8. Similar and conterminous circulates are such as begin and end at the same place; as $56.\dot{7}898\dot{4}$, $8.\dot{5}268\dot{3}$ and $.\dot{0}567\dot{8}$, &c.

To find the finite value of any repetend, or to reduce it to a vulgar fraction. Take the given repeating figure or figures for the numerator; and for the denominator, take as many 9's as there are recurring figures or places in the given repetend.

So $\cdot\dot{3} = \frac{3}{9} = \frac{1}{3}$; and $\cdot 0\dot{5} = \cdot 0\frac{5}{9} = \frac{5}{90} = \frac{1}{18}$;

and $\cdot\dot{1}2\dot{3} = \frac{123}{999} = \frac{41}{333}$; and $2\cdot\dot{6}\dot{3} = 2\frac{63}{99} = 2\frac{7}{11}$.

To reduce a mixed repetend to its equivalent vulgar fraction.

Rule 1. To as many nines as there are figures in the repetend, annex as many cyphers as there are finite places, for a denominator.

2. Multiply the nines in the said denominator by the finite part, and add the repeating decimal to the product for the numerator.

3. If the repetend begins in some integral place, the finite value of the circulating part must be added to the finite part.

In like manner for a mixed circulate; consider it as divisible into its finite and circulating parts, and the same principle will be seen to obtain here also; thus the mixed circulate $.1\dot{6}$ is divisible into the finite decimal .1 and the repetend $.0\dot{6}$ but $.1 = \frac{1}{10}$ and $.0\dot{6}$ would be $= \frac{6}{9}$ provided the circulation began immediately after the place of units; but as it begins after the place of tens, it is $\frac{6}{9}$ of $\frac{1}{10} = \frac{6}{90}$, and so the vulgar fraction $= .1\dot{6}$ is $\frac{1}{10} + \frac{6}{90} = \frac{9}{90} + \frac{6}{90} = \frac{15}{90}$, and is the same as by the rule.

Hence it follows, that every such infinite repetend has a certain determinate and finite value, or can be expressed by a terminate vulgar fraction. It may farther be observed, that if the numerator of a vulgar fraction be 1, and the denominator any prime number, except 2 and 5, the decimal which shall be equal to that vulgar fraction, will always be a repetend, beginning at the first place of decimals; and this repetend must necessarily be a submultiple, or an aliquot part of a number expressed by as many 9's as the repetend has figures; that is, if the repetend have six figures, it will be a submultiple of 999999; if four figures, a submultiple of 9999, &c. From whence it follows, that if any prime number be called p, the series 9999 &c. produced as far as is necessary, will always be divisible by p, and the quotient will be the repetend of the decimal fraction $= \frac{1}{p}$.

For addition, subtraction, &c. of repetends, see ADDITION, &c.

It seems it was Dr. Wallis who first distinctly considered, or treated of infinite circulating decimals, as he himself informs us in his Treatise of Infinites. Since his time many other authors have treated on this part of arithmetic; the principal of these however, to whom the art is mostly indebted, are Messrs. Cunn, Martin, Emerson, Malcolm, Donn, and Henry Clarke, in whose writings the nature and practice of this art may be fully seen, especially in the last mentioned ingenious author. The most concise, yet perspicuous and comprehensive, rules we have yet seen for multiplication and division, of circulating decimals were given by a Mr. James Lamb, at pa. 56, of Whiting's Mathematical Delights.

CIRCULA'TION. *s.* (from *circulate.*) 1. Motion in a circle (*Burnet*). 2. A series in which the same order is always observed, and things always return to the same state (*Swift*). 3. A reciprocal interchange of meaning (*Hoo.*).

CIRCULATION OF THE BLOOD (*circulatio*, from *circulo*, to compass about). A vital action performed in the following manner: the blood is returned into the right auricle of the heart by the descending and ascending venæ cavæ, which, when distended, contracts and sends its blood into the right ventricle; from the right ventricle it is propelled through the pulmonary artery to circulate through, and undergo a change in, the lungs, being prevented from returning into the right auricle by the closing of the valves, which are situated there for that purpose. Having undergone this change in the lungs, it is brought to the left auricle of the heart by the four pulmonary veins, and thence is evacuated into the left ventricle. The left ventricle, when distended, contracts, and throws the blood through the aorta to every part of the body, to be returned by the veins into the two venæ cavæ. It is prevented from passing back from the left ventricle into the auricle by a valvular apparatus; and the beginning of the pulmonary artery and aorta is also furnished with similar organs, to prevent its returning into the ventricles. (See HEART.) It is by means of this important action, that every part of the body lives, becomes warm, and is nourished, the various secretions separated, and the chyle converted into blood. In the fœtus the blood passes from the umbilical veins, partly into the vena portæ, and partly through the canalis venosus, into the ascending cava. The lungs being contracted, a very small quantity circulates through them, and the greater part flows through the canalis arteriosus and foramen ovale to the left

side of the heart, and into the aorta, and is carried back by the umbilical arteries to the placenta.

The propulsive power on which the circulation depends, is by no means clearly decided, to this moment. For, if the heart be the organ whence it commences and on which it chiefly depends, we are still ignorant of the power that stimulates the heart. Mr. J. Hunter derives this stimulus from a sympathetic affection of the heart with the lungs—but this is to remove the punctum saliens from the heart to the lungs themselves: independently of which no such sympathy appears to subsist in fetal life in which the heart beats with punctuality while the lungs are comparatively quiescent. Dr. Darwin, and many other physicians, again resolve it into the oxygen of the pulmonary blood returned to the heart; but the same difficulties attach to this theory as to the first. The common belief is, that the right auricle is stimulated by the return of the venous blood in a full column from the ascending and descending venæ cavæ; but this is to make the venous system the source of motion instead of the arterial.

Circulation of the sap. See Sap.

Circulation. In chemistry, a process by which vapour raised by fire, falls back to be returned and distilled several times for the purpose of refining or rectifying it as much as possible. It is performed either in a pelican, or in a double vessel, consisting of two pieces luted on each other. The heat is supplied either by a lamp, or ashes, or sand, or dung, or the sun, and it is often necessary to continue it for days, weeks, or even months.

CIRCULATORY. In chemistry, the vessel employed in the process of circulation.

CIRCULUS, is a round iron instrument used by chemists in cutting off the necks of glass vessels. The circulus being heated, is applied to the vessel at the place at which it is intended to be cut, and when the latter becomes sufficiently hot, a little cold water, or a blast of cold air, occasions it to fly off evenly and regularly. If a thread, first dipped in oil of turpentine, bé tied round the place where the section is to be made, the same purpose may be answered by setting fire to the thread, and sprinkling cold water on the place, which will crack the glass exactly where the thread touched in burning.

Circulus arteriosus iridis. The artery which runs round the iris and forms a circle, is so termed.

CIRCUMA'MBIENCY. *s.* (from *circumambient*.) The act of encompassing (*Brown*).

CIRCUMA'MBIENT. *a.* (*circum* and *ambio*, Lat.) Surrounding; encompassing (*Wilkins*).

To CIRCUMA'MBULATE. *v. n.* (*circum* and *ambulo*, Lat.) To walk round about.

To CIRCUMCI'SE. *v. a.* (*circumcido*, Lat.) To cut the prepuce, according to the law given to the Jews (*Luke*).

CIRCUMCISION, the act of cutting off the prepuce; a ceremony in the Jewish and Mahometan religions, wherein they cut off the foreskin of their males, who are to profess the one or the other law. Circumcision commenced in the time of Abraham; and was, as it were, the seal of a covenant stipulated between God and him. It was in the year of the world 2178, that Abraham, by divine appointment, circumcised himself, and all the males of his family; from which time it became an hereditary practice among his descendants. The ceremony, however, was not confined to the Jews; but it obtained also among the Egyptians and Ethiopians. The practice of circumcision among the Hebrews, however, differed very considerably from that of the Egyptians. Among the first is was a ceremony of religion, and was performed on the eighth day after the birth of the child; among the latter a point of mere decency and cleanliness; and, as some will have it, of physical necessity; and was not performed until the 13th year, and then on girls as well as boys.

Among the Jews, the time for performing this rite was the eighth day, that is, six full days after the child was born. The law of Moses ordained nothing with respect to the person by whom, the instrument with which, or the manner how, the ceremony was to be performed; the instrument was generally a knife of stone. The child is usually circumcised at home, where the father, or god-father, holds him in his arms, while the operator takes hold of the prepuce with one hand, and with the other cuts it off; a third person holds a porringer, with sand in it, to catch the blood; then the operator applies his mouth to the part, and, having sucked the blood, spits it into a bowl of wine, and throws a styptic powder upon the wound. This ceremony was usually accompanied with great rejoicings and feasting; and it was at this time that the child was named in the presence of the company. The Jews invented several superstitious customs at this ceremony, such as placing three stools, one for the circumcisor, the second for the person who holds the child, and the third for Elijah, who, they say, assists invisibly at the ceremony, &c.

The Jews distinguish their proselytes into two sorts, according as they became circumcised or not: those who submitted to this rite were looked upon as the children of Abraham, and obliged to keep the laws of Moses; the uncircumcised were only bound to observe the precepts of Noah, and were called Noachidæ. The Turks never circumcise till the seventh or eighth year, as having no notion of its being necessary to salvation. The Persians circumcise their boys at 13, and their girls from nine to 15. Those of Madagascar cut the flesh at three several times; and the most zealous of the relations present, catches hold of the preputium and swallows it.

Circumcision is practised on women by cutting off the foreskin of the clitoris, which bears a near resemblance and analogy to the preputium of the male penis. We are told that the Egyptian captive-women were circumcised; and also the subjects of Prester John

Circumcision is also the name of a feast, celebrated on the first of January, in commemoration of the circumcision of our Saviour.

To CIRCUMDU'CT. *v. a.* (*circumduco*, Latin.) To contravene; to nullify (*Ayliffe*).

CIRCUMDU'CTION. *s.* (from *circumduct.*) 1. Nullification; cancellation (*Ayliffe*). 2. A leading about (*Hooker*).

CIRCU'MFERENCE. *s.* (*circumferentia*, Latin.) 1. The periphery; the line including and surrounding any thing (*Newton*). 2. The space enclosed in a circle (*Milton*). 3. The external part of an orbicular body. 4. An orb; a circle (*Milton*).

To Circu'mference. *v. a.* To include in a circular space (*Brown*).

CIRCUMFERENTOR, a mathematical instrument used by land-surveyors for taking angles by the magnetic needle. It is an instrument (where great accuracy is not desired) much used in surveying, in and about woodlands, commons, harbours, sea-coasts, in the working of coal-mines, &c. &c. where a permanent direction of the needle is of the most material consequence in surveying. The instrument is made of brass, and, in its most simple state, consists of the following parts: a brass index and circle, all of a piece. The index is commonly about 14 inches long, and an inch and a half broad; the diameter of the circle is about seven inches. On this circle is made a chart, whose meridian line answers to the middle of the breadth of the index, and is divided into 360 degrees. There is a brass ring soldered on the circumference of the circle, on which screws another ring, with a flat glass in it, so as to form a kind of box for the needle, suspended on the pivot in the centre of the circle. There are also two sights to screw on, and slide up and down the index; as also a spangle and socket screwed on the back side of the circle for putting the head of the staff in.

Let it be required by means of this instrument, to find the quantity of the angle EKG described in the plate. First place the circumferentor with the fleur-de-lis of the chart towards you; then direct your sights to E, and observe what degrees are cut by the south end of the needle, which may be 296; then turning the instrument about, direct your sights to G, noting then also what degrees are cut by the south end of the needle, which suppose 247. This done, always subtract the lesser from the greater, as in this example, 247 from 296, the remainder is 49 degrees, which is the true quantity of the angle EKG.

In plate 43, we have given a representation of a circumferentor made by Jones of Holborn on an improved construction. From a very simple contrivance, it is rendered sufficient to take angles with the accuracy of a common theodolite; and by it angles of altitude and depression may be observed as readily as horizontal ones. The improvement chiefly consists in an arm or index G, so applied to the centre of the compass box, and within it, that, at the time of observing, by only slipping out a pin *p*, the circle of degrees alone may move round, and leave the index G fixed. This index will remain stationary, from its being attached to the socket that screws on the head of the staffs. On the end of this index, next the degrees in the box, there is graduated a nonius scale, by which the circle of 360 degrees is subdivided into five minutes or less if desired. To take angles of altitude or depressions, the instrument is turned down on its ball and socket into a perpendicular position, and adjusted to its level by a plumb-line *l*, that is hung on a pin at the back of the box, and made to coincide with a mark made thereon. Then by looking through the small sight holes *s*, *s*, *s*, purposely made, the angles are shown on the circle of degrees by the nonius, as before. The arms AA of the instruments slip off at BB, and the whole packs into a case but 5½ inches square and 3 deep.

CIRCUMFLEX, in grammar, an accent, serving to note, or distinguish, a syllable of an intermediate sound between acute and grave; and generally somewhat long.

The Greeks had three accents; the acute, the grave, and the circumflex; formed thus, ´, `, ˜. In Latin, English, French, &c. the circumflex is made thus ^.

The acute raises the voice, and the grave falls, or lowers it: the circumflex is a kind of undulation, or wavering of the voice, between the two.

The form of the Greek circumflex was anciently the same with that of ours, viz. ^; being a composition of the other two accents in one.—But the copyists, changing the form of the characters, and introducing the running-hand, changed also the form of the circumflex accent; and instead of making a just angle, rounded it off, adding a dash, through too much haste; and thus formed an *s*, laid horizontally, which produced this figure ˜, instead of this ^.

CIRCUMFLEXUS (*circumflexus*, *musculus*). In anatomy. Circumflexus palati of Albinus. Sphæno-salpingo-staphilinus, seu staphilinus externus of Winslow. Musculus tubæ novæ of Valsalva. Pelato-salpingeus of Douglas. This muscle arises from the spinous process of the sphenoid bone, behind the foramen ovale, which transmits the third branch of the fifth pair of nerves; from the Eustachian tube, not far from its osseous part; it then runs down along the pterygoideus internus, passes over the hook of the internal plate of the pterygoid process by a round tendon, which soon spreads into a broad membrane. It is inserted into the velum pendulum palati, and extends as far as the suture which joins the two bones. Generally some of its posterior fibres join with the constrictor pharyngis superior, and palato-pharyngæus. Its use is to stretch the velum, to draw it downwards, and to a side towards the hook. It hath little effect upon the tube, being chiefly connected to its osseous part.

CIRCU'MFLUENCE. *s.* (from *circumfluent.*) An enclosure of waters.

CIRCU'MFLUENT. *a.* (*circumfluens*, Lat.) Flowing round any thing (*Pope*).

CIRCU'MFLUOUS. *a.* (*circumfluus*, Lat.) Environing with waters (*Pope*).

CIRCUMFORA'NEOUS. *a.* (*circumforaneus*, Lat.) Wandering from house to house.

To CIRCUMFU'SE. *v. a.* (*circumfusus*, Latin.) To pour round; to spread every way (*Bacon*).

CIRCUMFU'SILE. *a.* (*circum* and *fusilis*, Latin.) That may be poured round any thing (*Pope*).

CIRCUMFU'SION. *s.* The act of spreading round; the state of being poured round.

To CIRCU'MGYRATE. *v. a.* (*circum* and *gyrus*, Lat.) To roll round (*Ray*).

CIRCUMGYRA'TION. *s.* (from *circumgyrate.*) The act of running round (*Cheyne*).

CIRCUMJA'CENT. *a.* (*circumjacens*, Latin.) Lying round any thing.

CIRCUMI'TION. *s.* (*circumitum*, Latin.) The act of going round.

CIRCUMLIGA'TION. *s.* (*circumligo*, Latin.) 1. The act of binding round. 2. The bond with which any thing is encompassed.

CIRCUMLOCU'TION. *s.* (*circumlocutio*, Latin.) 1. A circuit or compass of words; periphrasis (*Swift*). 2. The use of indirect expressions (*L'Estrange*).

CIRCUMMU'RED. *s.* (*circum* and *murus.*) Walled round (*Shakspeare*).

CIRCUMNA'VIGABLE. *a.* That may be sailed round (*Ray*).

To CIRCUMNA'VIGATE. *v. a.* (*circum* and *navigo.*) To sail round.

CIRCUMNAVIGA'TION. *s.* The act of sailing round (*Arbuthnot*).

CIRCUMNAVIGA'TOR. *s.* One that sails round.

CIRCUMPLICA'TION. *s.* (*circumplico*, Latin.) 1. The act of enwrapping on every side. 2. The state of being enwrapped.

CIRCUMPO'LAR. *a.* (from *circum* and *polar.*) Round the pole.

Circumpolar stars, those stars which, by means of their vicinity to the elevated pole, move round it without setting.

CIRCUMPOSI'TION. *s.* (from *circum* and *position.*) The act of placing any thing circularly (*Evelyn*).

CIRCUMPOTATIO, a funeral feast, very common among the Athenians and Romans, in honour of the dead.

CIRCUMRA'SION. *s.* (*circumrasio*, Lat.) The act of shaving or paring round.

CIRCUMROTA'TION. *s.* (*circum* and *roto*, Latin.) The act of whirling round like a wheel.

CIRCUMSCINDED CAPSULE. In botany. Cut round. Opening, not longitudinally or vertically, as in most capsules, but transversely or horizontally, like a snuff-box; usually about the middle, so as to fall nearly in two equal hemispheres. Instances of this we have in anagallis, hyoscyamus.

To CIRCUMSCRI'BE. *v. a.* (*circum*, and *scribo*, Latin.) 1. To enclose in certain lines or boundaries. 2. To bound; to limit; to confine (*Southern*).

CIRCUMSCRIBED FIGURE, a figure that is drawn above another, so that all its sides or planes touch the latter or inscribed figure.

Circumscribed hyperbola, is one of Newton's hyperbolas of the second order, that cuts its asymptotes, and contains the parts cut off within its own space.

CIRCUMSCRIBING, in geometry, denotes the describing a polygon about a circle, in such a manner that all its sides shall be tangents to the circumference. Sometimes the term is used for the describing a circle about a polygon, so that each side is a chord; but in this case it is more usual to say the polygon is inscribed, than the circle is circumscribed.

CIRCUMSCRI'PTION. *s.* (*circumscriptio*, Latin.) 1. Determination of particular form or magnitude (*Ray*). 2. Limitation; boundary (*Shakspeare*).

CIRCUMSCRI'PTIVE. *a.* (from *circumscribo.*) Enclosing the superficies (*Grew*).

CIRCUMSPE'CT. *a.* (*circumspectum*, Lat.) Cautious; watchful on all sides (*Boyle*).

CIRCUMSPE'CTION. *s.* (from *circumspect.*) Watchfulness on every side; caution; general attention (*Clarendon*).

CIRCUMSPE'CTIVE. *a.* (*circumspectum*, Latin.) Attentive; vigilant; cautious (*Pope*).

CIRCUMSPE'CTIVELY. *ad.* (from *circumspective.*) Cautiously; vigilantly.

CIRCUMSPE'CTLY. *ad.* (from *circumspect.*) Watchfully; vigilantly (*Ray*).

CIRCUMSPE'CTNESS. *s.* (from *circumspect.*) Caution; vigilance (*Wotton*).

CI'RCUMSTANCE. *s.* (*circumstantia*, Latin.) 1. Something appendant or relative to a fact (*South*). 2. Accident; something adventitious (*Davies*). 3. Incident; event (*Clarendon*). 4. Condition; state of affairs (*Bentley*).

To Ci'rcumstance. *v. a.* To place in particular situation, or relation to the things (*Donne*).

Some circumstances are reckoned purely physical, not connecting any moral good or evil with any action; such as killing a man with the right or left hand, &c. Others are accounted properly moral, because they do really influence our actions, and render them more good or evil than they would have been without such circumstances.

The writers of ethics sum up all the circumstances of the actions of men in this one verse.

Quis, quid, ubi, quibus auxiliis, cur, quomodo, quando.

Quis, who, denotes the quality, state, age, &c. of the person. *Quid*, what, the greatness, smallness, multitude, fewness, &c. of the thing. *Ubi*, where, the place. *Quibus auxiliis*, with what assistances, the instruments, means, &c. *Cur*, why, on what account, with what view. *Quomodo*, how, the quality of the action, as to intention or remissness, designedness, or casualty, secrecy, or openness. *Quando*, when, the time; as on a holiday, at the hour of prayer, &c.

CIRCUMSTANT. *a.* (*circumstans*, Lat.) Surrounding; environing (*Digby*).

CIRCUMSTA'NTIAL. *a.* (*circumstantialis*, low Latin.) 1. Accidental; not essential (*South*). 2. Incidental; casual (*Donne*). 3. Full of small events; particular (*Prior*).

CIRCUMSTANTIAL EVIDENCE, in law, or the doctrine of presumption, takes place next to positive proof: circumstances which either necessarily or usually attend facts of a particular nature, that cannot be demonstratively evinced, are called presumptions, and are only to be relied on till the contrary be actually proved. See EVIDENCE and PRESUMPTION.

CIRCUMSTANTIA'LITY. *s.* (from *circumstantial.*) The appendage of circumstances.

CIRCUMSTA'NTIALLY. *ad.* 1. According to circumstance; not essentially; accidentally (*Glanville*). 2 Minutely; exactly (*Broome*).

To CIRCUMSTA'NTIATE. *v. a.* (from *circumstance.*) 1. To place in particular circumstances (*Bra.*). 2. To place in a particular condition (*Swift*).

CIRCUMSTANTIBUS, in law, is used for the supplying, and making up the number of jurors (in case any impannelled appear not; or appearing, be challenged by either party), by adding to them so many of the persons present, or standing by, as will serve the turn. This act of supplying is usually called Tales de circumstantibus.

To CIRCUMVA'LLATE. *v. a.* (*circumvallo*, Latin.) To enclose round with trenches or fortifications.

CIRCUMVALLA'TION. *s.* (from *circumvallate.*) 1. The art or act of casting up fortifications round a place (*Watts*).

CIRCUMVALLATION, or line of circumvallation, in military affairs, implies a fortification of earth, consisting of a parapet and trench, made round the town intended to be besieged, when any molestation is apprehended from parties of the enemy, which may march to relieve the place Care is to be taken to have the most exact plan of it possible; and upon this the line of circumvallation and the attack are projected. This line, being a fortification opposed to an enemy that may come from the open country to relieve the besieged, ought to have its defences directed against them; that is, so as to fire from the town; and the besiegers are to be encamped behind this line, and between it and the place. The camp should be as much as possible out of the reach of the shot of the place; and the line of circumvallation, which is to be farther distant from the place than the camp, ought still more to be out of the reach of its artillery. See FORTIFICATION.

CIRCUMVE'CTION. *s.* (*circumvectio*, Latin.) 1. The act of carrying round. 2. The state of being carried round.

To CIRCUMVE'NT. *v. a.* (*circumvenio*, Lat.) To deceive; to cheat; to delude (*Knolles*).

CIRCUMVE'NTION. *s.* (from *circumvent.*) 1. Fraud; imposture; cheat (*Collier*) 2. Prevention; preoccupation (*Shakspeare*).

To CIRCUMVE'ST. *v. a.* (*circumvestio*, Latin.) To cover round with a garment (*Wotton*).

CIRCUMVOLA'TION. *s* (*circumvolo*, Latin.) The act of flying round.

To CIRCUMVO'LVE. *v. a.* (*circumvolvo*, Latin.) To roll round (*Glanville*).

CIRCUMVOLU'TION. *s.* (*circumvolutus*, Latin.) 1. The act of rolling round. 2. The state of being rolled round (*Arbuthnot*). 3. The thing rolled round another (*Wilkins*). 4. In architecture, the turns of the spiral line of the ionic order.

CIRCUS, in antiquity, a large building, either round or oval, used for the exhibiting of shows to the people. The Roman circus was a large oblong edifice, arched at one end; encompassed with porticos, and furnished with rows of seats, placed ascending over each other. In the middle was a kind of foot-bank, or eminence, with obelisks, statues, and posts at each end. This served them for the courses of their *bigæ* and *quadrigæ*. There were no less than ten circuses at Rome: the largest was built by the elder Tarquin, called Circus Maximus, between the Aventine and Palatine mounts.

CIRCUS (Games of the), which some call Circensian games, were combats celebrated in the circus, in honour of Consus the god of councils; and thence also called Consualia. These games were instituted by Evander, and re-established by Romulus.

CIRENCESTER, a borough in Gloucestershire, with markets on Mondays and Fridays. The ruins of the walls are yet visible: it had a famous castle and an abbey. Many Roman antiquities have been discovered; and here the Roman roads crossed each other. This town contains about 4130 inhabitants. It is one of the greatest marts in England for wool, sends two members to parliament, and is seated on the river Churn. Lat. 51. 43 N. Lon. 1. 58 W.

CIRKNITZ, in geography. See ZIRCHNITZER.

CIRRIFEROUS LEAF. In botany, a tendril-bearing leaf, as in fumaria capreolata and claviculata. Cirriferous peduncle: a tendril-bearing peduncle; as in cardiospermum and vitis.

CIRROSE LEAF. In botany. Terminating in a cirrus or tendril: as in gloriosa, flagellaria, lathyris, &c.

CIRRUS, in botany. (*cirri, capilli intorti*, frizzled hair.) Some derive it from κερας, a horn; others from κειρειν, to shear; others from σκιρρος, a hard tumour; others again from circum, q. capilli circum torti: such is the uncertainty of derivation. Linnéus explains it to be, vinculum filiforme spirale, quo planta alio corpori alligatur. He writes it with an *h.* See TENDRIL.

CIRRUS, in antiquity, a kind of knotted fringe added to the borders of garments.

CIRSOCELE, (κιρσοκηλη, from κιρσος, a varix or dilatation of a vein, and κηλη, a tumour). The disease commonly but improperly called CIRCOCELE, which see.

CIRSOPHTHALIMA, (from Κιρσος, *varix*,

and ὀφθαλμα,) a varicose dilatation of the vessels of the tunica conjunctiva. See OPHTHALMIA.

CISALPINE, any thing on this side the Alps. The Romans divided Gaul and the country now called Lombardy, into Cisalpine and Transalpine. That which was Cisalpine with regard to the Romans, is Transalpine with regard to us. Our Gallic neighbours have lately revived the term, calling Italy, after they had conquered it, the Cisalpine republic.

CISLEU, in Hebrew chronology, the ninth month of their ecclesiastical, and third of their civil year, answering to part of our November and December.

CISSAMPELOS. In botany, a genus of the class dioecia, order monadelphia. Male; calyx four-leaved; corolless; nectary wheel-shaped; stamens four. Female: calyx one-leafed, ligulate-roundish; corolless; styles three; berry one-seeded. Five species; natives of the West Indies or the Cape. The two chief are:

1. C. pareira; with peltate leaves, heart-shaped, emarginate, entire: the pareira brava of the dispensatories.

2. C. caapeba: the root of which applied externally is said to be an antidote against the bite of venemous serpents. It is a native of Jamaica, and the warmest parts of America; with entire leaves, petioled at the base.

CISSOID, in the higher geometry, is a curve line of the second order, invented by Diocles, an ancient Greek geometrician, for the purpose of finding two continued mean proportionals between two other given lines. The generation of this curve may be thus given. On the extremity B of the diameter AB of the circle AOB (See *Cissoid*, Pl. 6.) erect the indefinite perpendicular CBD, to which from the other extremity A draw several lines cutting the circle in I, O, N, &c. and upon these lines set off the corresponding equal distances, viz. $HM = AI$, $FO = AO$, $CL = AN$, &c. then the curve line drawn through all the points M, O, L, &c. is the cissoid. Other methods of constructing this curve may be seen in Newton's Universal Arithmetic, and Emerson on Curve Lines.

CISSOID (Properties of the). 1. The curve has two infinite legs AMOL, *Amol*, meeting in a cusp A, and tending continually towards the indefinite line CBD, which is their common asymptote. 2. The curve passes through O and *o*, points in the circle equally distant from A and B; or it bisects each semicircle. 3. Letting fall perpendiculars MP, IK from any corresponding points I, M, then is $AP = BK$, and $AM = HI$, because $AI = MH$. 4. $AP : PB :: MP^2 : AP^2$. So that, if the diameter AB be $=a$, the absciss $AP = x$, and the ordinate $PM = y$; then is $x : a - x :: y^2 : x^2$, or $x^3 = y^2 . \overline{a - x}$, which is the equation of the curve. 5. The whole infinitely long cissoidal space, contained between the infinite asymptote BCD, and the curves LOA*ol*, &c. of the cissoid, in equal to triple the generating circle AOB*o*A. 6. All cissoids are similar figures.

CISSUS. Wild grape. In botany, a genus of the class tetrandria, order monogynia. Berry one-seeded, surrounded with the calyx, and four-parted corol. Nineteen species: East and West Indies, Cape, South America. The stems are generally climbing, with tendrils that cling hold of whatever support they may meet with in other plants or props. C. trifoliata, a native of Jamaica, is a shrub with a red flower, and climbs above the tallest trees of the island. The fruit is sometimes eaten by the natives as an esculent.

CIST. *s.* (*cista*, Latin.) A case; a tegument.

CI'STED. *a.* (from *cist.*) Enclosed in a cist.

CISTELA. In the entomology of Fabricius, a tribe of insects belonging to the order coleoptera, and genus cryptocephalus. See CRYPTOCEPHALUS.

CISTERCIANS, in church-history, a religious order founded in the 11th century by St. Robert, a Benedictine. They became so powerful, that they governed almost all Europe, both in spirituals and temporals. Cardinal de Vitri, describing their observances, says, they neither wore skins nor shirts; nor ever ate flesh, except in sickness; and abstained from fish, eggs, milk, and cheese: they lay upon straw-beds, in tunics and cowls; they rose at midnight to prayers: they spent the day in labour, reading, and prayer; and in all their exercises observed a continual silence. The habit of the Cistercian monks is a white robe in the nature of a cassock, with a black scapulary and hood, and is girt with a woollen girdle. The nuns wear a white tunic, and a black scapulary and girdle.

CISTERN, denotes a reservoir, or vessel serving as a receptacle for rain or other water, for the necessary uses of a family. Thus, there are lead-cisterns, jar-cisterns, &c. Anciently there were cisterns all over the country in Palestine. There were some likewise in cities and private houses. As the cities for the most part were built in mountains, and the rains fell regularly in Judea at two seasons of the year only, in spring and autumn, people were obliged to keep water in cisterns in the country for the use of their cattle, and in cities for the convenience of the inhabitants. There are still cisterns of very large dimensions to be seen in Palestine, some whereof are 150 paces long, and 54 wide. There is one to be seen at Ramah of 32 paces in length, and 28 in breadth. Wells and cisterns, springs and fountains, are generally confounded in scripture language.

As the water collected in leaden cisterns is apt to corrupt, either by stagnating for several days, when the pipes happen to be obstructed, or by the deposition of feculent matter, as well as the incrustation formed in such vessels, it follows that they ought to be frequently cleansed of the copious sediment they contain. This attention is the more necessary, as lead is a metal liable to be dissolved by acids; and, in that state, proves a slow, but fatal poison.

Although the acidity contained in stagnant water which has, in its course, been impregnated with animal and vegetable particles, cannot be very considerable, yet it will be more safe, and prudent, to prevent the formation of such acids, by an early attention to the purity of the water. See FILTRATION.

CISTOULES, in botany. See ALLIUM.

CISTULA. See CATOPTRIC CISTULA.

CISTUS. Rock-rose. In botany, a genus of the class polyandria, order monogynia. Calyx of five unequal leaves; petals five; capsule superior, angular, three-valved, many seeded. Seventy-eight species; chiefly natives of Spain and the Mediterranean coasts. They may be thus subdivided.

A. Without stipules; shrubby.
B. Without stipules; under shrubs.
C. Without stipules; herbaceous.
D. With stipules; herbaceous.
E. With stipules; under shrubs.

C. creticus, so called from its frequency in the isle of Crete, produces from its leaves the gum ladanum of the shops. This genus throughout almost the whole of its species affords elegant ornaments to our gardens, as well in regard to their foliage, which is for the most part ever-green, and beautifully variegated in shades, as their flowers, which are chiefly white, purple, and yellow. These flowers last only a single day, but there is a perpetual succession of new ones from the same plant for six weeks or two months. The greater part of them may be propagated either from seeds or cuttings, and thrive best on a dry soil. C. helianthemum or dwarf cistus, is the species most frequently met with in our own gardens, and requires no other care than to be kept clear from weeds.

CISTUS (Marsh). In botany. See LEDUM.

CISTUS (Lesser marsh). See AMDROMEDA.

CISTUS (Nettle-leaved). See TURNERA.

CISTUS (Rape of). See ASARUM.

CIT. *s.* (contracted from *citizen.*) An inhabitant of a city; a pert low townsman.

CITADEL, a place fortified with four, five, or six bastions, built on a convenient ground near a city; that it may command it in case of a rebellion. The city therefore is not fortified on the part opposite to the citadel, though the citadel is against the city. The best form for a citadel is a pentagon, a square being too weak, and a hexagon too big.

CI'TAL. *s.* (from *cite.*) 1. Reproof; impeachment (*Shakspeare*). 2. Summons; citation; call into court. 3. Quotation; citation.

CITA'TION. *s.* (*citatio*, Latin.) 1. The calling a person before a judge (*Ayliffe*). 2. Quotation; the adduction of any passage from another author. 3. The passage or words quoted (*Watts*). 4. Enumeration; mention (*Harvey*).

CI'TATORY. *a.* (from *to cite.*) Having the power or form of citation (*Ayliffe*).

To CITE. *v. a.* (*cito*, Latin.) 1. To summon to answer in a court. 2. To enjoin; to call upon another authoritatively; to direct; to summon (*Prior*). 3. To quote (*Hooker*).

CI'TER. *s.* (from *cite.*) 1. One who cites into a court. 2. One who quotes; a quoter (*Atterbury*).

CITE'SS. *s.* (from *cit.*) A city woman (*Dryden*).

CITHARA. See CINYRA.

CITHARŒDI, in antiquity, an order of musicians always taking the precedency.

CITHAREXYLUM. Fiddle-wood. In botany, a genus of the class didynamia, order angiospermia. Calyx five-toothed, campanulate; corol funnel-form, wheel-shaped, the divisions villous above and equal; drupe two-seeded; nuts two-celled. Six species; natives of the West Indies and South America. In their natural climates beautiful ever-green, tall trees; but among ourselves they never appear otherwise than as ever-green shrubs, and require the warmth of the stove to exist in any way. They may be propagated by seeds or cuttings.

CITIZEN, a native or inhabitant of a city, vested with the freedom and liberties of it. The term citizen became general among the French people during the time of the republic. A citizen of Rome was distinguished from a stranger, because he belonged to no certain commonwealth subject to the Romans. A citizen is either by birth or election; and sons may derive the right from their fathers. To make a good Roman citizen, it was necessary to be an inhabitant of Rome, to be inrolled in one of the tribes, and to be capable of dignities Those to whom were granted the rights and privileges of Roman citizens, were only honorary citizens. It was not lawful to scourge a citizen of Rome. See Acts xxii. 24—29.

CI'TIZEN. *a.* Having the qualities of a citizen (*Shakspeare*).

CITOLE, a musical instrument, much like the dulcimer.

CITRAGO. See MELISSA.

CITRARIA. See MELISSA.

CITRATS, are salts formed by the union of citric acid with different bases. They are all decomposable by heat by the strong mineral acids, and by some of the vegetable ones. The principal citrats are the following:

Citrat of ammonia, which is prepared by saturating lemon juice with carbonat of ammonia: it is very soluble, but difficult of crystallization. It is employed in medicine. *Citrat of barytes* is formed by pouring barytic water into a solution of citric acid, till the acid is saturated, when the citrat is deposited, first in powder, and afterwards in crystals. *Citrat of lime* is prepared by dissolving carbonat of lime in citric acid, and is always formed when the acid is obtained from lemon juice by means of lime or chalk. It is usually in the state of a white powder; scarcely soluble in water; but is rendered extremely soluble by an excess of acid, and may be obtained from that solution in crystals. *Citrat of magnesia* is produced by dissolving carbonat of magnesia in citric acid, and evaporating the solution, when the citrat

rises in the vessel in a mushroom form, white and opaque. *Citrat of potash* is, in like manner, prepared by dissolving the carbonat of potash in citric acid, and evaporating. This salt crystallizes, but with difficulty, and is very deliquescent. It has long been used in medicine, and forms the chief ingredient in saline draughts. *Citrat of soda*, may be procured by a similar process; and by proper evaporation it may be obtained in a crystalline form. It is very soluble, and slightly efflorescent. The metallic citrats have been but little examined, and not applied to any use.

CITRE'A. See LIMON.

CITRIC ACID, or ACID OF LEMONS, so called because it is obtained in greater abundance from the juice of that fruit than from any other substance; exists, when pure, in the form of colourless, alum-shaped crystals, either pyramidal or rhomboidal: its taste is so intensely sour, as to be even painful; but when diluted it is exceedingly pleasant: it is so soluble that one ounce of distilled water will dissolve an ounce and a half of acid, in a moderate heat; and boiling water will dissolve twice its own weight. It acts upon iron, zinc, tin, lead, and various other metals. Being composed of carbon and hydrogen, united with oxygen, nitric acid, by altering the proportion of its principles, converts it into oxalic and sometimes into acetic acid. It is decomposable by heat. It is used for various domestic purposes; also in medicine, and in the arts, particularly by calico-printers, for discharging colour. Its crystals are not altered by exposure to the air. Combined with earthy, alkaline, and metallic bases, it forms the salts called citrats. This acid may also be procured from unripe grapes, cranberries, oranges, and other sour fruit; and has been formed, by Vauquelin, from gum, by the oxymuriatic acid.

Scheele was the first person who obtained this acid in a state of purity, and pointed out its peculiar properties; his method, which is still in frequent use, is as follows: saturate lemon juice, while boiling, with powdered chalk, adding it gradually till all effervescence ceases. A whitish powder, composed of citric acid and lime (citrat of lime) falls to the bottom, leaving the mucilage, &c. in the supernatant liquor, which may be thrown away. The citrat of lime is then to be washed with water till it passes off colourless. Let sulphuric acid be added to the precipitate, equal in weight to the chalk, but previously diluted with about six times its weight of water. If the mixture be boiled for a few minutes, the sulphuric acid combines with the lime, and the citric acid passes into the liquor. After straining off the latter, it is to be evaporated slowly to the consistence of a syrup, and left a few days to crystallize. A small excess of sulphuric acid is necessary, for without it the citric acid will only concrete, and not crystallize. In preparing the acid in the great way, it is requisite to redissolve the crystals first obtained, filter the solution, and again crystallize, until the acid is reduced to a state of perfect purity. Mr. Accum observes that four parts of chalk require for saturation ninety-four parts of lemon juice, and that seven parts and a half of citrat of lime are thus produced; to decompose which he says nearly twenty parts of sulphuric acid are necessary. It appears from the same author that citric acid may now be manufactured at a much cheaper rate than was formerly thought possible. In the above process the complete separation of the citric acid from the sulphat of lime and extract, may be much facilitated by the addition of a little alcohol towards the end of the first evaporation, and interrupting the heat. The following is the process given by Richter: saturate lemon juice with potash, and then add a solution of acetited lead, as long as any precipitate, which is very copious, continues to fall down. This is chiefly citrat of lead. Wash it, and digest with dilute sulphuric acid, as in the former process, which unites with the lead, and sets at liberty the citric acid; then evaporate the liquor to a thick consistence, add a few drops of nitric acid, and crystallize. In preparing the acid for the table, however, Scheele's method is certainly preferable, on account of the danger attending the use of lead in its acid combinations.

Citric acid is sometimes adulterated with tartareous; and the presence of this latter acid may be thus detected: add to a saturated solution of sulphat of potash in cold water, a quantity of a saturated solution of the acid to be tried; if it contain any tartareous acid, the mixture will deposit in a short time a number of minute grains of tartar; but if it consists only of citric acid, it will remain clear.

Lemon juice is partially clarified for the sake of preserving it for commercial or domestic purposes in various ways; sometimes by suffering it to remain at rest in a cold cellar for a day or two; sometimes by first boiling it, and then suffering it to cool; sometimes it is concentrated by freezing, and at others, additions of different kinds are made to it, as brandy, alcohol, or sulphuric acid. But the best way is to evaporate it considerably by a gentle heat, after it has been partially clarified by rest: it will then keep in bottles for many years without alteration, and may thus be conveniently transported from place to place. In this state it is called rob of lemons. Other particulars may be found under the term LEMON JUICE. (*Accum. Rees. Thomson. Gren. Nicholson. &c.*)

CI'TRINE. *a.* (*citrinus*, Latin.) Lemon coloured; of a dark yellow (*Floyer*).

CI'TRINE. *s.* (from *citrinus*, Lat.) A species of crystal of an extremely pure, clear, and fine texture, generally free from blemishes (*Hill*).

CITRON, in botany. See CITRUS.

CITRON-WATER, a cordial, is made of fine thin lemon peel, eighteen ounces, orange peel nine ounces, nutmegs four ounces, rectified spirit of wine two gallons and a half: these should be digested in balneo-mariæ for one night, then drawn off with a slow fire, and as much water added as will just make the matter milky (about seven quarts); the whole to be

sweetened with two pounds of loaf-sugar, or fine sugar-candy. Some hang in a cloth in the head of the still, sprinkled with ambergrise in powder, or its essence, by way of improving the flavour of the composition.

CITRUL. In botany. See CITRULLUS and CUCURBITA.

CITRULLUS. Sicilian citrul, or water-melon. The seeds of this plant, cucurbita citrullus; foliis multipartitis, of Linnéus, were formerly used medicinally, but now only to reproduce the plant. Water-melon is cooling, and somewhat nutritious; but so soon begins to ferment, as to prove highly noxious to some stomachs, and bring on spasms, diarrhœas, cholera morbus, colics, &c. See CUCURBITA.

CITRUS. Citron, orange, and lemon-tree. A genus of the class polyadelphia, order icosandria. Calyx five-cleft; petals five, oblong; anthers twenty; the filaments united into various bodies; berry nine-celled. Six species: all natives of Asia.

1. C. angulata; small glutinous fruit, angular.

2. C. Japonica; fruit the size of a cherry.

3. C. decumana, or shaddock; small fruit.

4. C. trifoliata. These three are scarcely worth particularising farther. The last is a thorny shrub, with fruit resembling the medlar.

5. C. medica. Citron-tree, with linear petioles; leaves ovate, pointed. The lemon-tree is but a variety of c. medica, and there are several other varieties.

6. C. aurantium; with winged petioles, leaves acute, stem shrubby. The chief varieties of c. aurantium are,

α. Seville-orange; the hardiest and at the same time the most beautiful of the entire species. Even in our own country it grows strong and easily, and produces excellent fruit when properly managed.

β. China-orange; the leaves of this variety are less, and the tree smaller than the former: the fruit also differs in being smooth, thin rinded, and sweet, while that of the Seville-orange is larger, rough rinded, and sour.

γ. Forbidden fruit; in trunk, leaves, and flower, this has a strong resemblance to the last; but the ripe fruit is larger and oblong.

δ. Horned-orange; a tree of moderate size; the rind of whose fruit breaks into laminæ like horn, whence its trivial name.

ε. Hermaphrodite-orange; a moderate sized tree, with a fruit intermixing the appearance of c. medica and c. aurantium.

ζ. Dwarf or nutmeg-orange, with a long stem and small bushy head, growing two or three feet high, with very small fruit.

The seeds from rotten lemons or citrons are generally preferred for raising stocks for budding, whether for oranges or for lemons. But there is a much more expeditious way of supplying our green-houses by purchasing such trees as are brought over every year from Italy. These are as large when we receive them as those of our own produce will be in ten or twenty years growth; and though they have but small heads then, will be brought to have very good ones in three years, and to produce very fine fruit. In the choice of these trees, those which have two buds in stock are preferable to those which have only one; and the straitness of the stem, freshness of the branches, and plumpness of the bark, are greatly to be regarded. When you have purchased a proper number of these trees, each of them is to be set in a tub of water, with its head and half its trunk above the surface; they are to stand in this three days, then they are to be taken out, their roots picked, and brushed clean, and the tops of the branches cut off, and they are to be planted singly, in pots just large enough to contain their roots, in a mixture of fresh earth and rotten cow-dung. These are to be set in a moderate hot tanners bark-bed, and some pot-shreds must be always put at the bottom of the pots, to keep their holes from being stopped, and give a free passage to the water. They are to be moderately watered at proper times, and by the month of June they will shoot out pretty long shoots, which must be stopped, in order to produce the lateral branches. They must now be hardened by degrees, and in the middle of July must be brought into the open air, in some warm situation, defended from winds, and from the too great heat of the sun. In September they must be removed into the green-house, and watered gently during the winter. In the succeeding summer, the branches must be stopped from growing to their lengths, to furnish a good head; and they must be frequently watered. And after this, they will require no farther management, but to be new potted every year; which should be done in April, and the earth prepared for it a year beforehand, of cow-dung and fresh earth. The roots should be soaked a quarter of an hour in water, and afterwards scrubbed very clean, before they are put into the new pot.

If old orange-trees have bad heads, the way to mend them is to cut them mostly off, and proceed with them in the same manner as with the trees brought from Italy.

All orange-trees require frequent waterings, but these should not be large; there must always be a passage for the water to run off at the bottom of the pot or tub; they must have as much fresh air in winter as the season will allow, and they should not be placed too near each other in the green-house. In summer they should be placed where they may have the morning and evening sun, without too much wind; and they should not be housed till October.

CITTADELLA, the chief town in the island of Minorca. It is situated on its western coast, and contains about 600 houses. Lat. 39. 54 N. Lon. 3. 34 E.

CITTERN, the old English name of the guitar.

CITY, according to Cowel, is a town corporate, which hath a bishop and cathedral church; and it is called civitas, oppidum, and

urbs: civitas, in regard it is governed by justice and order of magistracy; oppidum, because it contains a great number of inhabitants; and urbs, because it is in due form surrounded with walls. Kingdoms have been said to contain as many cities as they have seats of archbishops and bishops: but, according to Blount, city is a word that hath obtained since the conquest; for, in the time of the Saxons, there were no cities, but all the great towns were called burghs, and even London was then called Londonburgh, as the capital of Scotland is called Edinburgh. And long after the conquest the word city is used promiscuously with the burgh, as in the charter of Leicester, where it is both called civitas and burgus; which shows that those writers were mistaken who tell us every city was, or is, a bishop's see. And though the word city signifies with us such a town corporate as hath usually a bishop and a cathedral church, yet it is not always so. We could easily spin out a page of conjectural remarks upon this subject; but this would be very different from a just definition of a city, which we confess it is not in our power to give, except in so far as we have done above, upon the authority of Cowel.

The freedom of cities was first established in Italy, owing principally to the introduction of commerce. It afterwards made its way into France, where Louis the Gross, in order to create some power that might counterbalance those potent vassals who controlled or gave law to the crown, first adopted the plan of conferring new privileges on the towns situated within his own domain. These privileges were called charters of community, by which he enfranchised the inhabitants, abolished all marks of servitude, and formed them into corporations or bodies politic, to be governed by a council and magistrates of their own nomination. The practice spread quickly over Europe, and was adopted in Spain, England, and Scotland, and all the other feudal kingdoms.

In England, the establishment of communities or corporations was posterior to the conquest. The practice was borrowed from France, and the privileges granted by the crown were perfectly similar to those above enumerated. It is not improbable, that some of the towns in England were formed into corporations under the Saxon kings; and that the charters granted by the knights of the Norman race were not charters of enfranchisement from a state of slavery, but a confirmation of privileges which they had already enjoyed. The English cities, however, were very inconsiderable in the twelfth century. A clear proof of this occurs in the history just referred to. Fitz-Stephen, a contemporary author, gives a description of the city of London in the reign of Henry II. and the terms in which he speaks of its trade, its wealth, and the number of its inhabitants, would suggest no inadequate idea of its state at present, when it is the greatest and most opulent city in Europe. But all ideas of grandeur and magnificence are merely comparative. It appears from Peter of Blois, archdeacon of London, who flourished in the same reign, and who had good opportunity of being informed, that this city, of which Fitz-Stephen gives such a pompous account, contained no more than 40,000 inhabitants. The other cities were small in proportion.

CITIES (Imperial), an appellation given to those cities of Germany immediately subject to the emperor: they make a part of the Germanic body, are governed by their own magistrates, have the privilege of coining money, and assist at the diet of the empire. They are forty-eight in all, and are distinguished in general by their prosperity and opulence.

CIVES. In botany. See ALLIUM.

CIVET. In natural history. See VIVERRA.

CI'VIC. *a.* (*civicus*, Lat.) Relating to civil honours; not military (*Pope*).

CIVICUS, an epithet applied to a kind of crown, made of oaken leaves; anciently bestowed by the Romans on those who saved the life of a fellow-citizen in a battle, or an assault. The civic crown was exceedingly esteemed, and was even given as an honour to Augustus; who on this occasion struck coins with this device, ob cives servatos. It was also granted to Cicero, after his discovery of Catiline's conspiracy. See CROWN.

CIVIDAD DE LAS PALMAS, an episcopal town of the island of Canary. Lat. 28. 5 N. Lon. 15. 22 W.

CIVIDAD REAL, a town of New Castile, in Spain, 90 miles S. of Madrid. Lat. 38. 58 N. Lon. 3. 25 W.

CIVIDAD RODRIGO, an episcopal town of Leon, in Spain, 115 miles W. of Madrid. Lat. 40. 33 N. Lon. 5. 58 W.

CIVIDAD DI FRIULI, an ancient town of Friuli, in Italy, belonging to the Venetians. Lat. 46. 12 N. Lon. 13. 15 E.

CI'VIL. *a.* (*civilis*, Latin.) 1. Relating to the community; political; relating to the city or government (*Hooker*). 2. Not in anarchy; not wild (*Roscommon*). 3. Not foreign; intestine (*Bacon*). 4. Not ecclesiastical; as, the ecclesiastical courts are controlled by the civil. 5. Not natural; as, a person banished is said to suffer civil, though not natural, death. 6. Not military; as, the civil magistrate's authority is obstructed by war. 7. Not criminal; as, this is a civil process, not a criminal prosecution. 8. Civilized; not barbarous (*Spenser*). 9. Complaisant; gentle; well bred (*Dryden*). 10. Grave; sober (*Milton*). 11. Relating to the ancient consular or imperial government (*Shakspeare*).

CIVIL DEATH, any thing that retrenches or cuts off a man from civil society, as a condemnation to the hulks, perpetual banishment, condemnation to death, outlawry, and excommunication.

CIVIL LAW, is that law which every particular nation, commonwealth, or city, has established peculiarly for itself. The civil law is either written or unwritten; and the written law is public or private; public, which immediately regards the state of the commonwealth,

as the enacting and execution of laws, consultations about war and peace, establishment of things relating to religion, &c.; private, that more immediately has respect to the concerns of every particular person. The unwritten law, is custom introduced by the tacit consent of the people only, without any particular establishment. The authority of it is great, and it is equal with a written law, if it be wholly uninterrupted, and of a long continuance.

The civil law is allowed in this kingdom in the two universities, for the training up of students, &c. in matters of foreign treaties between princes; marine affairs, civil and criminal; in the ordering of martial causes; the judgment of ensigns and arms; rights of honour, &c.

Civil list, the money allotted for the support of the king's household, and for defraying certain charges of government.

Civil war, a war between people of the same state, or the citizens of the same city.

Civil year, is the legal year, or annual account of time, which every government appoints to be used within its own dominions, and is so called in contradistinction to the natural year, which is measured exactly by the revolution of the heavenly bodies.

CIVILIAN, in general, denotes something belonging to the civil law; but more especially the doctors and professors thereof are called civilians: of these we have a college or society in London, known by the name of Doctors-commons.

CIVI'LITY. *s.* (from *civil.*) 1. Freedom from barbarity (*Davies*). 2. Politeness; complaisance; elegance of behaviour (*Clarendon*). 3. Rule of decency; practice of politeness.

To CI'VILIZE. *v. a.* (from *civil.*) To reclaim from savageness and brutality (*Waller*).

CI'VILIZER. *s.* (from *civilize.*) He that reclaims others from a wild and savage life.

CI'VILLY. *ad.* (from *civil.*) 1. In a manner relating to government. 2. Not criminally (*Ayliffe*). 3. Politely; complaisantly; gently; without rudeness (*Collier*). 4. Without gay or gaudy colours (*Bacon*).

CIVITA DI PENNA, an episcopal town of Naples, in Italy. Lat. 42. 27 N. Lon. 14. 52 E.

Civita Castellana, a town of St. Peter's Patrimony, in Italy, 25 miles N. of Rome. Lat. 42. 25 N. Lon. 12. 35 E.

Civita Vecchia, a sea-port town of St. Peter's Patrimony, in Italy. The pope's galleys are stationed here; and it has been made a free port. This is the ancient Centum Cellæ. Lat. 42. 5 N. Lon. 11. 51 E.

CIZE. *s.* (from *incisa*, Lat.) The quantity of any thing, with regard to its external form: often written *size* (*Grew*).

CLACK. *s.* (*klatchen*, German, to rattle.) 1. Any thing that makes a lasting and importunate noise: generally used in contempt for the tongue (*Prior*). 2. *The* Clack *of a mill.* A bell that rings when more corn is required to be put in; or, that which strikes the hopper and promotes the running of the corn (*Betterton*).

To Clack. *v. n.* (from the noun.) 1. To make a chinking noise. 2. To let the tongue run.

CLACKMANNAN, a small county of Scotland, having Fifeshire on the E., Perthshire on the N. and W., and Stirlingshire on the S. This shire, together with Kinross, sends one member to parliament. Its chief town has the same name. Lat. 56. 5 N. Lon. 3. 40 W. The county has 10,858 inhabitants.

CLAD. *part. pret.* Clothed; invested (*Swift*).

CLADENTERIA, in antiquity, a festival celebrated at the time of pruning the vines.

CLAGENFURT, a strong town of Carinthia, in Germany, subject to the house of Austria. It is 150 miles S.W. of Vienna. Lat. 46. 53 N. Lon. 14. 20 E.

To CLAIM. *v. a.* (from *clamer*, Fr.) To demand of right; to require authoritatively (*Locke*).

Claim. *s.* (from the verb.) 1. A demand of any thing, as due. 2. A title to any privilege or possession in the hands of another (*Locke*). 3. (In law.) A demand of any thing that is in the possession of another (*Cowell*).

CLA'IMABLE. *a.* (from *claim.*) That may be demanded as due.

CLA'IMANT. *s.* (from *claim.*) He that demands any thing, as unjustly detained by another.

CLA'IMER. *s.* (from *claim.*) He that makes a demand.

CLAIRAULT (Alexis), of the French Academy of Sciences, was one of the most illustrious mathematicians in Europe. He read to the academy in 1726, when he was not thirteen years old, a Memoir upon four new geometrical curves of his own invention; and supported the character he thus laid a foundation for, by various publications from time to time. He published, Elémens de Géométrie, 1741, in 8vo.; Elémens d'Algebre, 1746, in 8vo.; Théorie de la Figure de la Terre, 1743, in 8vo.; Tables de la Lune, 1754, in 8vo. He was concerned also in the Journal des Sçavans, which he furnished with many excellent extracts. He died in 1765. He was one of the academicians who were sent into the north to determine the figure of the earth. See farther Montucla de Histoire des Mathematiques, tom. iv.

CLAIR-OBSCURE. See Claro-obscuro.

CLAMATOR, in antiquity, a domestic whose business was to call the guests to dinner.

To CLA'MBER. *v. n.* To climb with difficulty (*Shakspeare. Ray*).

To CLAMM. *v. n.* (clemian, Saxon.) To clog with any glutinous matter (*L'Estrange*).

CLA'MMINESS. *s.* (from *clammy.*) Viscosity; viscidity; tenacity (*Moxon*).

CLA'MMY. *a.* (from *clamm.*) Viscous; glutinous; tenacious; ropy (*Addison*).

CLA'MOROUS. *a.* (from *clamour.*) Vociferous; noisy; turbulent; loud (*Swift*).

CLA'MOUR. *s.* (*clamor*, Lat.) Outcry; noise; exclamation; vociferation (*King Ch.*).

To CLA'MOUR. *v. n.* To make outcries; to exclaim; to vociferate (*Shakspeare*).

CLAMP. *s.* (*clamp*, French.) 1. A piece of wood joined to another, as an addition of strength. 2. A quantity of bricks (*Mortimer*). See BRICKMAKING.

To CLAMP. *v. a.* (from the noun.) Ends of tables are commonly clamped (*Moxon*).

CLAMPING, in joinery, the fitting a piece of board with the grain to another piece of board across the grain.

CLAN. *s.* (*klaan*, in the Highlands, signifies children.) 1. A family; a race (*Milton*). 2. A body or sect of persons (*Swift*).

The nations which overran Europe were originally divided into many small tribes; and when they came to parcel out the lands which they had conquered, it was natural for every chieftain to bestow a portion, in the first place, upon those of his own tribe or family. These all held their lands of him; and as the safety of each individual depended on the general union, these small societies clung together, and were distinguished by some common appellation, long before the introduction of surnames or ensigns armorial. Thus clanships were formed; and, in a generation or two, that consanguinity, which was at first in a great measure imaginary, was believed to be real. An artificial union was converted into a natural one: men willingly followed a leader, whom they regarded both as the superior of their lands and the chief of their blood; and served him not only with the fidelity of vassals, but the affection of friends. Against such men a king contended with great disadvantage; and that cold service, which money purchases, or authority extorts, was not an equal match for their ardour and zeal. Robertson's History of Scotland, vol. i. p. 27, 28.

CLA'NCULAR. *a.* (*clancularius*, Lat.) Clandestine; secret; private (*Decay of Piety*).

CLANDE'STINE. *a.* (*clandestinus*, Lat.) Secret; hidden; private (*Blackmore*).

CLANDE'STINELY. *ad.* (from *clandestine.*) Secretly; privately (*Swift*).

CLANG. *s.* (*clangor*, Lat.) A sharp, shrill noise (*Milton*).

To CLANG. *v. n.* (*clango*, Lat.) To clatter; to make a loud shrill noise (*Prior*).

CLA'NGOUR. *s.* (*clangor*, Lat.) A loud shrill sound (*Dryden*).

CLA'NGOUS. *a.* (from *clang.*) Making a clang (*Brown*).

CLANGULE. In ornithology. See ANAS.

CLANK. *s.* (from *clang.*) A loud, shrill, sharp noise (*Spectator*).

To CLAP. *v. a.* (clappan, Saxon.) 1. To strike together with a quick motion (*Job*). 2. To add one thing to another (*Taylor*). 3. To do any thing with a sudden hasty motion, or unexpectedly (*Prior*). 4. To celebrate or praise by clapping the hands, to applaud (*Dryden*). 5. To infect with a venereal poison (*Wiseman*). 6. *To* CLAP *up*. To complete suddenly (*Howel*).

To CLAP. *v. n.* 1. To move nimbly with a noise (*Dryden*). 2. To enter with alacrity and briskness upon any thing (*Shakspeare*). 3. To strike the hands together in applause.

CLAP. *s.* (from the verb.) 1. A loud noise made by sudden collision (*Swift*). 2. A sudden or unexpected act or motion (*Swift*). 3. An explosion of thunder (*Hakewill*). 4. An act of applause (*Addison*). 5. A venereal infection. (See GONORRHŒA.) 6. The nether part of the beak of a hawk.

CLA'PPER. *s.* (from *clap.*) 1. One who claps with his hands. 2. The tongue of a bell (*Addison*).

To CLAPPERCLA'W. *v. a.* (from *clap* and *claw.*) To tongue beat; to scold.

CLARE, a town of Suffolk, having a market on Mondays. Lat. 52. 12 N. Lon. 0. 36 E.

CLARE, a town of Ireland, capital of a county of the same name, 17 miles N.W. of Limerick. Lat. 52. 52 N. Lon. 8. 46 W.

CLARE, a county of Ireland, in the province of Munster, 55 miles in length, and 38 in breadth; bounded on the E. and S. by the Shannon, which separates it from Tipperary, Limerick, and Kerry; on the W. by the ocean, and on the N. by Galway. It contains two market-towns, and 76 parishes, and sends four members to parliament.

CLARE (Nuns of St.), were founded at Assisa in Italy, about the year 1212. These nuns observed the rule of St. Francis, and wore habits of the same colour with those of the Franciscan friars: and hence were called Minoresses; and their house, without Aldgate, the Minories, where they were settled when first brought over into England, about the year 1293. They had only three houses besides this.

CLARENCIEUX, the second king at arms, so called from the duke of Clarence, to whom he first belonged; for Lionel, third son to Edward III. having by his wife the honour of Clare in the county of Thomond, was afterwards declared duke of Clarence; which dukedom afterwards escheating to Edward IV. he made this earl a king at arms. His office is to marshal and dispose of the funerals of all the lower nobility, as baronets, knights, esquires, on the south side of the Trent; whence he is sometimes called surroy or south-roy, in contradistinction to norroy.

CLARENDON (Constitutions of), certain constitutions made in the reign of Henry II. A. D. 1164, in a parliament held at Clarendon, near Salisbury, whereby the king checked the power of the pope and his clergy, and greatly narrowed the total exemption they claimed from secular jurisdiction.

CLARENDON, the name of a township of America, near the centre of Rutland county, Vermont: also the name of a parish of Jamaica, in the county of Middlesex; as well as of the village three miles east of Salisbury, mentioned above.

CLARET, or CLAIRET, pale red, a name which the French give to such of their red

wines as are not of a deep or high colour. See WINE.

The word is a diminutive of *clair*, bright, transparent. There are various accounts in the Phil. Trans. of attempts to improve the operation of tapping, by injecting the abdomen after the lymph is drawn off with claret and other astringents. Ibid. vol. xlix. part ii. no. 65, an. 1756.

CLARET, CLARETUM, in the ancient pharmacy, was a kind of wine sweetened with sugar, and impregnated with aromatics; sometimes also called Hippocras, or vinum Hippocraticum; because supposed to have been first prescribed by Hippocrates.

CLARICHORD, or MANICHORD, a musical instrument in the form of a spinnet, but much older. It has 70 strings, and 49 or 50 stops, which bear on five bridges; some of the strings are in unison: it is called also the dumb spinnet, on account of the chords being covered with pieces of cloth, which render the sound sweeter, and deaden it that it cannot be heard at a great distance.

CLARIFICA'TION. *s.* (from *clarify.*) The act of making any thing clear from impurities (*Bacon*).

CLARIFICATION, the process of clearing or fining any fluid from all heterogeneous matter or feculence, and is distinguished from filtration by the employment of chemical means, whereas the latter is only a mechanical operation. Clarification is performed either by heat, or by the addition of some substance which will unite with, and precipitate or raise to the surface, the matter which renders the liquor turbid.

The substances usually employed are white of eggs, blood, and isinglass: the two first are generally used for such liquors as are clarified while hot; the last for such as are clarified in the cold, such as wines, &c. The whites of eggs are beat up into a froth, and mixed with the liquor, when they unite with the impure matters that float in it; and on becoming hard by the heat, they carry them up to the surface in the form of a scum, no longer dissoluble in the liquid. Blood operates in the same manner, and is used in the refining of sugar, and in purifying the brine from which salt is made. Great quantities of isinglass are used in clarifying turbid wines: some throw into the cask an entire piece, which dissolves by degrees and forms a skin upon the surface, which at length subsiding, carries down with it the feculent matter floating in the wine; others dissolve the isinglass previously, and diffuse it through the liquor by stirring, or by rolling the cask. For the clearing of malt liquors, particularly beer, there are several methods; such as casting into it a quantity of fixed nitre, or whites of eggs made into balls with a little flour and isinglass; or by adding to it, during the time of its fermentation, a small portion of ardent spirit.

CLARIFICATION OF QUILLS. See QUILL.

To CLA'RIFY. *v. a.* (*clarifier*, French.) 1. To purify or clear any liquor (*Bacon*). 2. To brighten; to illuminate (*South*).

CLARIGATIO, in Roman antiquity. 1. A ceremony that always preceded a formal declaration of war. 2. The apprehending a man and holding him to bail.

CLARIGATION, in the law of nations, denotes a clear call, or summons made to an enemy, to demand satisfaction for some injury received; in defect whereof recourse will be had to reprisals.

CLARINET, a wind instrument of the reed kind, the scale of which, though it includes every semitone within its extremes, is virtually defective. Its lowest note is E below the F cliff, from which it is capable, in the hands of good solo performers, of ascending more than three octaves. Its powers through this compass are not every-where equal; the player, therefore, has not a free choice in his keys, being generally confined to those of C and F, which, indeed, are the only keys in which the clarinet is heard to advantage. The music for this instrument is therefore usually written in those keys. There are, however, B flat clarinets, A clarinets, D clarinets, B clarinets, and G clarinets; though the three latter are scarcely ever used in this country. (*Busby's Dict.*).

CLARINO, a musical term for trumpet.

CLARION, a kind of trumpet, whose tube is narrower, and tone more shrill, than the common trumpet.

CLA'RITY. *s.* (*clarté*, French.) Brightness; splendour (*Raleigh*).

CLARKE (Samuel), a learned English divine. He was born in 1675, at Norwich, of which city his father was alderman, and member of parliament for several years. After going through the usual course of education at the free-school of Norwich, he went to Caius college, Cambridge, where he applied to the study of the new philosophy with uncommon success. Rohault's Physics was then the text book in natural philosophy at Cambridge; this Mr. Clarke translated into better Latin, with notes, agreeable to the new system, at the age of 22. He then applied to theology, and when he was ordained, became chaplain to bishop Moore of Norwich, who treated him with great friendship, and gave him the rectory of Draycot, in Norfolk. In 1701 he published his Paraphrase of the Gospel of St. Matthew, which was afterwards extended to the remaining Gospels, the whole making two vols. in 8vo. In 1704 he preached the Boyle's lecture, and gave such satisfaction that he was appointed to preach that of the year following. These sermons have been printed, and are universally admired. About this time, according to Whiston, he embraced Arianism, and it is observed, that he never read the Athanasian creed but once, and that was by mistake, when it was not appointed. In 1706 he printed his letter to Dodwell on the Immortality of the Soul, a philosophical and learned discourse. This controversy lasted for some time. The same year appeared his translation of sir Isaac Newton's Optics into Latin, for which the philosopher complimented him with 500*l.* He was also at this time presented to the rectory

of St. Bennet's, Paul's wharf, London, and appointed chaplain to queen Anne. In 1709 he obtained the rectory of St. James's, Westminster, and then took his degree of D.D. at Cambridge. In 1712 he published an elegant edition of Cæsar's Commentaries, dedicated to the duke of Marlborough. This year came out his celebrated book, entitled, The Scripture Doctrine of the Trinity, which was not only written against by numerous writers, but complained of by the lower house of convocation. The second edition appeared in 1719, much amended and enlarged. In 1715, and the following year, he had a dispute with Leibnitz, on the principles of natural philosophy and religion: this was conducted with great ability on both sides; and is generally acknowledged to be the most acute metaphysical controversy that ever was conducted. In 1717, he printed remarks upon Collins's Philosophical Enquiry concerning Human Liberty. About a year afterwards the doctor ventured to make an innovation in the doxology in the singing Psalms; as,

To God, *through* Christ, his only son,
Immortal glory be, &c.

And,

To God, *through* Christ, his son, our Lord,
All glory be therefore, &c.

This attempt to Arianize the church gave such offence to bishop Robinson, of London, that he sent a circular letter to his clergy, warning them in solemn terms against the use of these forms. This occasioned a number of pamphlets to be written on the subject pro and con. At this time he was presented to the mastership of Wigston's hospital, in Leicester. In 1724, he published seventeen sermons, preached on several occasions. In 1727 he was offered the place of master of the mint, vacant by the death of sir Isaac Newton, but he refused it. In 1729 he published the first twelve books of Homer's Iliad, with a Latin version and annotations. The remaining books were published by his son in 1732. This great man, who had enjoyed an uniform state of health, was seized with a pain in his side, Sunday, May 11, 1729, as he was going to preach before the judges at Serjeant's-inn, and rendered incapable of discharging the duty. He was carried home, and medical aid proving vain, he died on the Saturday following. The same year appeared his Exposition of the Church Catechism, and ten volumes of his sermons.

As to the character of Dr. Clarke, he is represented as possessing one of the best dispositions in the world, remarkably humane and tender, free and easy in his conversation, cheerful and even playful in his manner. Bishop Hare says of him, "He was a man who had all the good qualities that could meet together to recommend him. He was possessed of all the parts of learning that are valuable in a clergyman, in a degree that few possess any single one. He has joined to a good skill in the three learned languages, a great compass of the best philosophy and mathematics, as appears by his Latin works; and his English ones are such a proof of his own piety, and of his knowledge in divinity, and have done so much service to religion, as would make any other man, that was not under a suspicion of heresy, secure of the friendship of all good churchmen, especially the clergy. And to all this piety and learning was joined a temper happy beyond expression; a sweet, easy, modest, obliging behaviour adorned all his actions; and neither passion, vanity, insolence, or ostentation, appeared either in what he said or wrote. This is the learning, this the temper of the man, whose study of the Scriptures has betrayed him into a suspicion of some heretical opinions." Bishop Hoadley too, having remarked how great the doctor was in all branches of learning, adds, "If in any one of these he had excelled only so much as he did in all, he would have been justly entitled to the character of a great man: but there is something so very extraordinary, that the same person should excel not only in those parts of knowledge which require the strongest judgment, but in those which require the greatest memory too. So that, in a very high degree, divinity and mathematics, experimental philosophy and classical learning, metaphysics and critical skill, were united in Dr. Clarke."

Clarke (Samuel), D. D. a preacher and writer of considerable note in the reign of Charles II. was, during the interregnum, and at the time of the ejection, minister of St. Bennet Fink in London. In November 1660, he, in the name of the presbyterian ministers, presented an address of thanks to the king for his declaration of liberty of conscience. He was one of the commissioners of the Savoy; and behaved on that occasion with great prudence and moderation. He sometimes attended the church as a hearer and communicant; and was much esteemed by all that knew him for his great probity and industry. The most valuable of his numerous works are said to be his Lives of the Puritan Divines and other persons of note, twenty-two of which are printed in his Martyrology; the rest are in his Lives of sundry Eminent Persons in this latter Age, folio; and in his Marrow of Ecclesiastical History, in folio and quarto. He died in 1680.

Clarke (Samuel), the son of the former, was fellow of Pembroke-hall, in Cambridge; but was ejected from his fellowship for refusing to take the engagements, as he was also afterwards from his rectory of Grendon in Buckinghamshire. He applied himself early to the study of the Scriptures; and his annotations on the Bible, printed together with the sacred text, is highly commended by Dr. Owen, Mr. Baxter, and Dr. Calamy. He died in 1701, aged seventy-five.

CLARO OBSCURO, or Clair-obscure, in painting, the art of distributing to advantage the light and shadow of a piece, both with respect to the easing of the eye, and the effect of the whole piece. See Painting.

Claro obscuro, or Chiaro-scuro, is also used to signify a design consisting only of two colours, most usually black and white, but

sometimes black and yellow; or it is a design washed only with one colour, the shadows being of a dusky brown, and the lights heightened up by white. The word is also applied to prints of two colours taken off at twice, whereof there are volumes in the cabinets of those who are curious in prints.

CLARUS, in ancient geography, a town of Ionia, famous for an oracle of Apollo, built by Manto, daughter of Tiresias, who fled from Thebes, after it had been destroyed by the Epigoni. She was so afflicted with her misfortunes, that a lake was formed with her tears, where she first founded the oracle. Apollo was from thence sirnamed Clarius (*Strab. Ovid.* &c.)—An island of the Ægean sea, between Tenedos and Scios.

CLARY. In botany. See SALVIA.

CLARY (Pyrenæan). See HORMINUM.

CLARY-WATER, a water composed of brandy, sugar, clary-flowers, and cinnamon, in which a little ambergris is dissolved. It is also prepared with brandy, juice of cherries, strawberries and gooseberries, cloves, white pepper, and coriander-seeds; the whole of which are infused, sweetened, and strained. This medicated water is said to assist digestion, and to be an excellent cardiac; but we have reason to apprehend that it is, like all other cordials, calculated to increase the catalogue of tipplers, rather than to promote the purposes of health.

To CLASH. *v. n.* (*klatsen*, Dutch.) 1. To make a noise by mutual collision (*Denham*). 2. To act with opposite power, or contrary direction (*South*). 3. To contradict; to oppose (*Spectator*).

To CLASH. *v. a.* To strike one thing against another, so as to produce a noise (*Dryden*).

CLASH. *s.* 1. A noisy collision of two bodies (*Denham*). 2. Opposition; contradiction (*Atterbury*).

CLASP. *s.* (*clespe*, Dutch.) 1. A hook to hold any thing close (*Addison*). 2. An embrace (*Shakspeare*).

To CLASP. *v. a.* (from the noun.) 1. To shut with a clasp (*Hooker*). 2. To catch and hold by twining (*Milton*). 3. To enclose between the hands (*Bacon*). 4. To embrace (*Smith*). 5. To enclose (*Shakspeare*).

CLA'SPER. *s.* (from *clasp.*) The tendril or thread of a creeping plant (*Ray*).

CLASPING, stem-clasping, embracing leaf (*folium amplexicaule*). Surrounding the stem at the base.

CLA'SPKNIFE. *s.* A knife which folds into the handle.

CLASS. *s.* (from *classis*, Latin.) 1. A rank or order of persons (*Dryden*). 2. A number of boys learning the same lesson at the school (*Watts*). 3. A set of beings or things (*Addison*).

To CLASS. *v. a.* To range according to some stated method of distribution (*Arbuthnot*).

CLASS, in systematic arrangement, the primary division of the subject to be treated of, or systematized; an assemblage of orders or genera, in which some common mark is so peculiar that it differs entirely from all other orders or genera. In our botanical, as well as in some other systems, classes are either natural or artificial. Natural classes are such as contain genera which are evidently related to each other: as umbellate, verticillate, siliquose, leguminose plants, the compound flowers, and grasses.

Artificial classes are merely succedaneums to natural ones, which we are obliged to adopt for want of a complete knowledge of the true characters of plants, and their relations to each other.

Natural classes have been attempted by Royen, Haller, Linnéus, Jussieu, and others.

Linnéus's artificial system or general arrangement of vegetables has twenty-four classes, besides the palms, &c. in a twenty-fifth. These are founded principally on the number, situation, and proportion of the stamens; and several of them are natural.

For class and classification in botany, zoology, medicine, &c. see BOTANY, ZOOLOGY, MEDICINE, &c.

CLASSIC, or CLASSICAL, an epithet chiefly applied to authors read in the classes at schools. This term seems to owe its origin to Tullius Servius, who, in order to make an estimate of every person's estate, divided the Roman people into six bands, which he called classes. The estate of the first class was not to be under 200l. and these, by way of eminence, were called classici, classics: hence authors of the first rank came to be called classics, all the rest being said to be infra classem: thus Aristotle is a classic author in philosophy; Aquinas in school divinity, &c.

CLASSICUM was the alarm for battle, given by the Roman generals; and sounded by trumpets and other martial music throughout the army.

CLASSIFICATION, in a general sense, denotes the arrangements or assortment of various objects into those several classes, denoted by appellatives, which, in the schools, are called genera and species.

CLA'SSIS. *s.* (Latin.) Order; sort; body.

CLATHRI, in antiquity, bars of wood or iron, used in securing doors and windows. There was a goddess called Clathra, that presided over the clathri.

CLATHRUS. In botany, a genus of the class cryptogamia, order fungi: fungus roundish, cancelled with fleshy branches interwoven with each other. One species only.

To CLA'TTER. *v. n.* (clazpunge, a rattle, Saxon.) 1. To make a noise by knocking two sonorous bodies frequently together (*Dryden*). 2. To utter a noise by being struck together. 3. To talk fast and idly (*Decay of Piety*).

To CLA'TTER. *v. a.* 1. To strike any thing so as to make it sound and rattle (*Milton*). 2. To dispute, jar, or clamour (*Martin*).

CLA'TTER. *s.* (from the verb.) 1. A rattling noise made by the frequent collision of sonorous bodies (*Swift*). 2. Any tumultuous and confused noise (*Ben Jonson*).

CLAVA. In zoology, a genus of the class vermes, order mollusca. Body fleshy, gregarious, clavate, and fixed by a round peduncle;

aperture single and vertical. One species only, c. paralytica, with a whitish, pellucid peduncle, opake red club or head, and covered with pellucid conic erect spines. Inhabits the Baltic on sea-weeds, shell-fishes, and floating timber; like the hydra it possesses the power of dilating and contracting the mouth.

CLAVARIA. Club-top. In botany, a genus of the class cryptogamia, order fungi: fungus oblong, simple or branched; seeds dispersed over the whole surface, or collected in tubercles opening at top. Thirty-seven species; of which some are simple, and others, about a third part, branched. The chief are,

1. C. tremotades, or oak-leather club-top, exactly resembling tanned leather, only that it is thinner and softer. It is commonly found in the clefts and hollows of old oaks; but sometimes in clefts of the ash. In Ireland it is used to dress ulcers with, and in Virginia to spread plasters upon.

2. C. militaris; clavate, entire; with a scaly head, whence its specific name. This and two or three other species grow only on the head of dead insects in the nympha state.

All the species of this order have by some naturalists been referred to the animal kingdom, and arranged in the zoophytic order of the class vermes, chiefly because of their emitting ammonia when burnt; and also because it is said that a visible spontaneous motion has been detected about the summits of their tubercles. Yet such motion has not been observed by other naturalists who have carefully watched for it, and most of the fungi offer in combustion some degree of ammoniacal fetor.

CLAVARIUM, an allowance made to the ancient Roman soldiers, to furnish nails for their shoes.

CLA'VATED. *a.* (*clavatus*, Lat.) Knobbed; set with knobs (*Woodward*).

CLAUDE, of Lorraine, a famous painter, born in 1600, and put apprentice to a pastry-cook. After serving out his time he went to Rome, and became labourer to a painter, who taught him some principles of his art. He soon proved an admirable landscape painter, and painted in fresco, as well as in oil. He died at Rome in 1682.

With regard to his landscapes, it has been remarked that his skies are warm and full of lustre, and every object is properly illumined. His distances are admirable, and in every part a delightful union and harmony not only excite our applause but our admiration. His invention is pleasing, his colouring delicate, and his tints have such an agreeable sweetness and variety, as have been but imperfectly imitated by the best subsequent artists, but were never equalled. He frequently gave an uncommon tenderness to his finished trees by glazing; and in his large compositions, which he painted in fresco, he was so exact that the distinct species of every tree might readily be distinguished. As to his figures, if he painted them himself, they are very indifferent; and he was so conscious of his deficiency in this respect, that he usually engaged other artists who were eminent to paint them for him; of which number were Courtois and Philippo Laura. His pictures are now very rare, especially such as are undamaged; and those are at this time so valued, that no price, however great, is thought to be superior to their merit. In order to avoid a repetition of the same subject, and also to detect such copies of his works as might be injurious to his fame, by being sold for originals, it was his custom to draw (in a paper-book prepared for this purpose) the designs of all those pictures which were transmitted to different countries; and on the back of the drawings, he wrote the name of the person who had been the purchaser. That book, which he entitled Libro di Verita, is now in the possession of the duke of Devonshire.

Claude (John), a French protestant minister. He was born in the province of Angenois in 1619, and was ordained at Montauban in 1645. He soon rendered himself famous by his treatise on the eucharist, which occasioned a controversy between him, the gentlemen of the port royal, Arnauld, and other learned men. He was suspended from preaching by order of the court, and at length he was obliged to quit the kingdom. He chose Holland for his asylum, where he obtained a pension from the prince of Orange, and preached frequently at the Hague. He died in 1687. He had a son called Isaac, who became minister of the Walloon church at the Hague, and died in 1695. John Claude's Treatise on the Composition of a Sermon has been translated into English by the late R. Robinson; and published with curious notes. The same translation without the notes has also been published by Mr. Simeon, with the addition of several skeletons of sermons.

Claude (St.), a city of France, in the department of Jura, with a bishop's see. It is seated between three high mountains on the river Lison, and owes its origin to a very celebrated abbey, built in 425, in this then barren and uninhabited country. Lat. 46. 24 N. Lon. 6. 18 E.

CLAUDENDA CURIA. See Curia.

CLA'UDENT. *a.* (*claudens*, Lat.) Shutting; enclosing; confining.

CLAUDIA, a patrician family at Rome, descended from Clausus, a king of the Sabines. It gave birth to many illustrious patriots.

Claudia, a name common to several Roman ladies, the most celebrated of whom are the following:—1. A vestal virgin accused of incontinence. To shew her innocence, she offered to remove a ship which had brought the image of Vesta to Rome, and had stuck in one of the shallow places of the river. This had already baffled the efforts of a number of men; and Claudia, after addressing her prayers to the goddess, untied her girdle, and with it easily dragged after her the ship to shore, and by this action was honourably acquitted.—2. A step-daughter of M. Antony, whom Augustus married, but dismissed undefiled, on account of a sudden quarrel with Fulvia. (*Suet. in Aug.*).—3. Pulcra, a cousin of Agrippina, accused of

adultery and criminal designs against Tiberius. She was condemned.

Claudia lex, de comitiis, was enacted by M. Cl. Marcellus in the year of Rome 702. It ordained, that at public elections of magistrates, no notice should be taken of the votes of such as were absent. Another, de usurâ, which forbad people to lend money to minors on condition of payment, after the decease of their parents. Another, de negotiatione, by Q. Claudius the tribune, 535. It forbad any senator or father of a senator to have any vessel containing above 300 amphoræ, for fear of their engaging themselves in commercial schemes. The same law also forbad the same thing to the scribes and the attendants of the quæstors, as it was naturally supposed that people who had any commercial connections could not be faithful to their trust, nor promote the interest of the state. Another, 576, to permit the allies to return to their respective cities, after their names were inrolled. (*Liv.* 41. c. 9). Another to take away the freedom of the city of Rome from the colonists which Cæsar had carried to Novicomum.

CLAUDIANUS, a celebrated poet in the age of Honorius and Arcadius, who seems to possess all the majesty of Virgil. Scaliger observes, that he has supplied the poverty of his matter by the purity of his language, the happiness of his expressions, and the melody of his numbers. As he was the favourite of Stilicho, he retired when his patron was disgraced, and passed the rest of his life in retirement and learned ease. His poems on Rufinus and Eutropius seem to be the best of his compositions. Among the various editions of Claudian, those by Gesner, at Leipzig, in 1759, two vols. 8vo., and by Burman, at Amsterdam, in 1760, 4to., are the most esteemed.

To CLA'UDICATE. *v. n.* (*claudico,* Lat.) To halt; to limp.

CLAUDICA'TION. *s.* The habit of halting.

CLAUDIUS. This name is common to many illustrious Romans, emperors, consuls, generals, censors, prætors, &c. &c. the most conspicuous of whom are the following:—Claudius I. (Tiber. Drusus Nero) son of Drusus, Livia's second son, succeeded as emperor of Rome, after the murder of Caligula. He made himself popular for a while, by taking particular care of the city, and by adorning and beautifying it with buildings. He passed over into Britain, and obtained a triumph for victories which his generals had obtained, and suffered himself to be governed by favourites, whose licentiousness and avarice plundered the state, and distracted the provinces. He married four wives, one of whom, called Messalina, he put to death on account of her lust and debauchery. He was at last poisoned by another called Agrippina, who wished to raise her son Nero to the throne. He died in the sixty-third year of his age, October 13, A. D. 54, after a reign of thirteen years. He was succeeded by Nero. (*Tacit.* &c.)—The second emperor of that name was a Dalmatian, who succeeded Gallienus. He conquered the Goths, Scythians, and Heruli, and killed no less than 300,000 in a battle; and after a reign of about two years, died of the plague in Pannonia. The excellence of his character is well known by these words of the senate, addressed to him: "Claudi Auguste, tu frater, tu pater, tu amicus, tu bonus senator, tu vera princeps."—3. Nero, a consul with Liv. Salinator, who defeated and killed Asdrubal, near the river Metaurum, as he was passing from Spain into Italy, to go to the assistance of his brother Annibal. (*Livy*).

CLAVE, the preterit of *cleave.*

CLAVECIN. (Fr.) In music, a harpsichord.

CLA'VELLATED. *a.* (*clavellatus,* low Lat.) Made with burnt tartar. A chemical term.

CLA'VER. *s.* (clæꝼꞃ, Saxon.) Clover.

CLAVICHORD, the clavier of the Germans, a musical stringed instrument, if not invented, greatly improved by the celebrated Euler. It is indeed an instrument of feeble sound; but is well fitted for giving every momentary gradation of strength by the pressure of the finger. It is therefore a good instrument for forming the musical taste by chamber practice, and was much used by compositors in their studies. It is also an ingenious, though seemingly an obvious and simple contrivance, and is capable of much more force, and even brilliancy of sound, than has generally been given to it.

The construction is shortly this. The inner end of the key is furnished with an upright piece, which terminates in an edge of brass, somewhat like the end of a narrow blunt chisel, whose line of direction is athwart the strings. When the key is pressed down, this edge strikes the string, and forces it out of the straight line in which it is stretched between its pins. Thus the string is shaken or jogged into vibration, in the same manner as we observe a tight rope set a vibrating by a sudden jerk given to any part of it. The string, thus agitated, gives a sound, which will continue for some little time if the key be held down. As the tone depends on the length of the vibrating string, as well as on its tension, it is of importance that the stroke be made on the precise point of the string which terminates the proper length. The string does not give the note corresponding to its whole length, but that which is produced by the part between the edge and the pin. And because the parts of the string on each side of the edge are equally thrown into vibration, the shorter portion of it must be wrapped up in a list of cloth, to prevent it from disturbing the ear by its sonorous vibrations. This, however, greatly diminishes the sweetness of the sound given by the other part.

The clavichord gives a fretful waspish kind of sound, not at all suited to tender expression. If the bridge (for the end of the key is really a bridge during the sound) were placed at an exact third of the length of the string, and if both parts were free, and if the stroke be of a

proper strength, the string would sound its twelfth with great sweetness, and with much more force and brilliancy than it does by the present construction, and the clavichord would be a charming instrument for a lesson and for private study. We say this from experience of the power of one constructed under the direction of Euler, who was also an excellent judge of music and musical composition. The tones of the upper part of that instrument had a sort of pipe or vocal sound, and were superior in clearness and sweetness to any stringed instrument we ever heard. But as this construction required every string to be one half longer than a harpsichord wire of the same pitch, and as this would have made the instrument of a most inconvenient size, the basses were made shorter, by placing the bridge at one-sixth of the length, and loading the shorter portion of the string with wire twisted round it. But although this was executed by a most dexterous artist, the tones were far inferior to those of the trebles, and the instrument was like the junction of a very fine one and a very bad one, and made but hobbling music. This was probably owing to the impossibility of connecting the metal wire and its covering with sufficient closeness and solidity. An upright clavichord, where the length would be no inconvenience, would be indeed a capital instrument for musical study. It is worthy of remark, that Mr. Euler tried other divisions of the string by the bridge. When it is struck precisely in the middle, it should sound its octave; when it is struck at one-fourth, it should give the double octave, &c. But the maker found that these divisions gave very indifferent and even uncertain tones; sometimes not sounding at all, and sometimes sounding beautifully. (*Sup. En. Brit.*).

CLAVICLE, in botany. See TENDRIL.

CLAVICLE, in anatomy. (*Clavicula*, dim. of *clavis:* so called from its resemblance to a key). Collar-bone. A bone shaped like the letter *ſ*, situated obliquely upon the upper part of the chest, and connecting the scapula and humerus to the thorax.

CLAVIOLE, a musical instrument invented by a Mr. J. I. Hawkins, formerly of New York, but now of Titchfield-street, London. This instrument may be played on with finger-keys, like a piano-forte, and comprehends all instruments of the viol kind from the violin to the double-bass. The strings of this instrument are gut-strings and rendered water-proof: and Mr. H. has contrived an equivalent to the common bow, possessing the faculty of rotation. Horse-hair is applied to a wheel so as to possess all the elasticity of the violin-bow. He has contrived a circular bow, where though the inner surface of the hair is polygonal, yet the angles are so very obtuse that the finest ear cannot discover their passage over the strings. Mr. Hawkins exhibited his instrument in America about seven years ago; when it was considered, by musicians, as equal in power to fifteen violins, tenors, and basses, and yet was capable of being played soft enough for an accompaniment to the most delicate female voice. The inventor has, we believe, an instrument of this kind now exhibiting at his repository in Titchfield-street. A more detailed account of the invention may be seen in Nos. 3. and 4. of the Retrospect.

CLAVICYTHERUM, the clavichord.

CLAVIUS (Christopher), a German Jesuit born at Bamberg, excelled in the knowledge of mathematics, and was one of the chief persons employed to rectify the kalendar; the defence of which he also undertook against those who censured it, especially Scaliger. He died at Rome in 1612, aged 75. His works have been printed in five volumes folio: the principal of which is his Commentary on Euclid's Elements.

CLAVUS, a purple band, or ornament upon the robes of the Roman senators and knights.

CLAVUS ANNALES, in antiquity, the Roman register of time; which was kept by means of nails fixed into walls or wainscots. There was an ancient law, ordaining the chief prætor to fix a nail every year on the Ides of September; it was driven into the right side of the temple of Jupiter Opt. Max. towards Minerva's temple.

CLAVUS, (*clavus*, a nail). A fixed pain in the forehead, which may be covered by one's thumb, giving a sensation like as if a nail were driven into the part. When connected with hysterics, it is called *clavus hystericus.* This term is also applied to corns, from their resemblance to the head of a nail.

CLAUSE. *s.* (*clausula*, Latin.) 1. A sentence; a single part of a discourse; a subdivision of a larger sentence (*Hooker*). 2. An article, or particular stipulation.

CLA'USTRAL. *a.* (from *claustrum*, Latin.) Relating to a cloister (*Ayliffe*).

CLA'USURE. *s.* (*clausura*, Latin.) Confinement (*Geddes*).

CLAU'THMUS. (κλαυθμος, from κλαιω, to weep.) In medicine, weeping, frequent shedding of tears, as a concomitant of certain diseases.

CLAW. *s.* (clapan, Saxon.) 1. The foot of a beast or bird, armed with sharp nails (*Spenser. Garth*). 2. A hand, in contempt.

To CLAW. *v. a.* (clapan, Saxon.) 1. To tear with nails or claws (*Shakspeare*). 2. To tear or scratch in general (*Hudibras*). 3. To scratch or tickle (*Shakspeare*). 4. *To* CLAW *off.* To scold (*L'Estrange*).

CLA'WBACK. *s.* A flatterer; a wheedler.

CLA'WED. *a.* (from *claw*.) Furnished or armed with claws (*Grew*).

CLAY. *s.* (*clai*, Welsh.) Unctuous and tenacious earth. See ARGILLA.

To CLAY. *v. a.* To cover with clay.

CLAY-COLD. *a.* Cold as the unanimated earth (*Rowe*).

CLAY-PIT. *s.* A pit where clay is dug.

CLA'YEY. *a.* Consisting of clay (*Derham*).

CLA'YISH. *a.* Partaking of the nature of clay (*Harvey*).

CLAY-LANDS. See HUSBANDRY.

CLA'YMARL. *s.* (*clay* and *marl.*) A whitish, smooth, chalky clay (*Mortimer*).

CLAYTONIA, in botany, a genus of the class pentandria, order monogynia. Calyx two-valved; coral five-petalled; stigma three-cleft; capsule three-valved, one-celled, three-seeded. Three species. Two of North America, C. Virginia, and C. perfoliata; and one, C. Siberica, a native of Siberia, with leaves nerved; red flowers, with bifid petals.

CLEAN. *a.* (clæne, Saxon.) 1. Free from dirt or filth (*Spenser*). 2. Chaste; innocent; guiltless. 3. Elegant; neat; not unwieldy (*Waller*). 4. Not leprous (*Leviticus*).

CLEAN. *ad.* 1. Quite; perfectly; fully (*Hooker*). 2. Without miscarriage (*Henley*).

To CLEAN. *v. a.* To free from dirt or filth.

CLE'ANLILY. *ad.* In a cleanly manner.

CLE'ANLINESS. *s.* (from *cleanly.*) 1. Freedom from dirt or filth (*Addison*). 2. Neatness of dress; purity (*Sidney*).

CLE'ANLY. *a.* (from *clean.*) 1. Free from dirtiness; pure in the person. 2. That makes cleanliness (*Prior*). 3. Pure; immaculate (*Glanville*). 4. Nice; artful (*L'Estrange*).

CLE'ANLY. *ad.* (from *clean.*) Elegantly; neatly.

CLE'ANNESS. *s.* (from *clean.*) 1. Neatness; freedom from filth. 2. Easy exactness; justness; natural, unlaboured correctness (*Dryd.*). 3. Purity; innocence (*Pope*).

To CLEANSE. *v. a.* (clæanſian, Saxon.) 1. To free from filth or dirt (*Prior*). 2. To purify from guilt (*Dryden*). 3. To free from noxious humours (*Arbuth.*). 4. To free from leprosy (*Mark*). 5. To scour (*Addison*).

CLE'ANSER. *s.* (clænſeꞃe, Saxon.) That which has the quality of evacuating any foul humours; a detergent (*Arbuthnot*).

CLEANTHES, a stoic philosopher, successor of Zeno. He was so poor, that to maintain himself, he used to draw out water for a gardener in the night, and study in the day-time. Cicero calls him the father of the stoics. It is said that he starved himself in his 90th year, B. C. 240. (*Strab. Cic.*).

CLEAR, or CAPE CLEAR, a promontory and small island on the south-west coast of Ireland. Lat. 51. 18 N. Lon. 11. 10 W.

CLEAR. *a.* (*clair,* French; *clarus,* Latin.) 1. Bright; transpicuous; pellucid; transparent; luminous (*Denham*). 2. Free from clouds; serene (*Milton*). 3. Without mixture; pure; unmingled. 4. Perspicuous; not ambiguous (*Temple*). 5. Indisputable; evident; undeniable (*Milton*). 6. Apparent; manifest; not hid (*Hooker*). 7. Quick to understand; acute (*Milton*). 8. Unspotted; guiltless; irreproachable (*Pope*). 9. Unprepossessed; impartial (*Sidney*). 10. Free from distress or prosecution (*Gay*). 11. Free from deductions or incumbrances. 12. Vacant; unobstructed (*Shakspeare*). 13. Unentangled; at a safe distance from any danger or enemy (*Shakspeare*). 14. Canorous; sounding distinctly (*Addison*). 15. Free; guiltless (*Dryden*).

CLEAR. *ad.* 1. Plainly, not obscurely (*Milton*). 2. Clean; quite; completely (*L'Estrange*).

CLEAR. *s.* A term used by builders for the inside of a house.

To CLEAR. *v. a.* 1. To make bright; to brighten (*Dryden*). 2. To free from obscurity (*Boyle*). 3. To purge from the imputation of guilt; to justify; to vindicate (*Hayward*). 4. To cleanse (*Shakspeare*). 5. To remove any encumbrance (*Addison*). 6. To free from any thing offensive (*Locke*). 7. To clarify; as, to clear liquors. 8. To gain without deduction (*Addison*). 9. *To* CLEAR *a ship,* at the customhouse, is to obtain the liberty of sailing, or of selling a cargo, by satisfying the customs.

To CLEAR. *v. n.* 1. To grow bright; to recover transparency. 2. To be disengaged from encumbrances, distress, or entanglements (*Bacon*).

CLE'ARANCE. *s.* A certificate that a ship has been cleared at the customhouse.

CLE'ARER. *s.* Brightener; purifier; enlightener (*Addison*)

CLE'ARLY. *adv.* (from *clear.*) 1. Brightly; luminously (*Hooker*). 2. Plainly; evidently (*Rogers*). 3. With discernment; acutely (*Ben Jonson*). 4. Without entanglement (*Bacon*). 5. Without by-ends; honestly (*Tillotson*). 6. Without deduction or cost. 7. Without reserve; without subterfuge (*Davies*).

CLE'ARNESS. *s.* (from *clear.*) 1. Transparency; brightness (*Bacon*). 2. Splendour; lustre (*Sidney*). 3. Distinctness; perspicuity (*Addison*). 4. Sincerity; honesty (*Bacon*). 5. Freedom from imputation of ill (*Shaksp.*).

CLEARSI'GHTED. *a.* (*clear* and *sight.*) Discerning; judicious (*Denham*).

To CLE'ARSTARCH. *v. a.* (*clear* and *starch.*) To stiffen with starch (*Addison*).

CLEATS, in ship-building, are pieces of wood of different shapes, used occasionally to fasten ropes upon in a ship: some have one arm, some two, and others have no arms.

To CLEAVE. *v. n.* pret. *clave.* (cleoꝑan, Sax.) 1. To adhere; to stick; to hold to (*Job*). 2. To unite aptly; to fit (*Shakspeare*). 3. To unite in concord (*Hooker. Knolles*). 4. To be concomitant (*Hooker*).

To CLEAVE. *v. a.* pret. *clove, clave,* or *cleft*; part. pass. *claven,* or *cleft.* (cleoꝑan, Sax.) 1. To divide with violence; to split (*Milton*). 2. To divide; to part naturally (*Deuteronomy*).

To CLEAVE. *v. n.* 1. To part asunder (*Pope*). 2. To suffer division (*Newton*).

CLE'AVER. *s.* (from *cleave.*) A butcher's instrument to cut animals into joints (*Arbuth.*).

CLEAVERS, in botany. See GALIUM APARINE.

CLEEBURY, or MORTIMER CLEEBURG, a town of Shropshire, with a market on Thursdays, 136 miles N. W. of London. Lat. 52. 21 N. Lon. 2. 23 W.

CLEES. *s.* The two parts of the foot of beasts which are cloven-footed.

CLEF, or CLIFF, in music, derived from the Latin word *clavis*, a key: because by it is expressed the fundamental sound in the diatonic scale, which requires a determined succession of tones or semitones, whether major or minor, peculiar to the note from whence we set out, and resulting from its position in the scale. Hence, as it opens a way to this succession, and discovers it, the technical term key is used with great propriety. But clefs rather point out the position of different musical parts in the general system, and the relations which they bear one to another. A clef, says Rousseau, is a character in music placed at the beginning of a stave, to determine the degree of elevation occupied by that stave in the general claviary or system, and to point out the names of all the notes which it contains in the line of that clef.

Anciently the letters by which the notes of the gamut had been signified were called clefs. Thus the letter A was the clef of the note la, C the clef of ut, E the clef of mi, &c. In proportion as the system was extended, the embarrassment and superfluity of this multitude of clefs were felt. Gui d'Arezzo, who had inverted them, marked a letter or clef at the beginning of each line in the stave; for as yet he had placed no notes in the spaces. In process of time they marked no more than one of the seven clefs at the beginning of one of the lines only; and this was sufficient to fix the position of all the rest, according to their natural order: at last, of these seven lines or clefs they selected four, which were called claves signatæ, or discriminating clefs; because they satisfied themselves with marking one of them upon one of the lines, from which the powers of all the others might be recognized. Presently afterwards they even retrenched one of these four, viz. the gamma, of which they made use to mark the sol below, that is to say, the hypoproslambanomene added to the system of the Greeks.

In reality Kircher asserts, that if we understood the characters in which the ancient music was written, and examined minutely the forms of our clefs, we should find that each of them represents the letter a little altered in its form, by which the note was originally named. Thus the clef of sol was originally a G, the clef of ut a C, and the clef of fa F.

We have then three clefs, one a fifth above the other; the clef of F, or fa, which is the lowest; the clef of ut, or C, which is a fifth above the former; and the clef of sol, or G, which is a fifth above that of ut. (See Plate 40.) These are usually appropriated to the bass, tenor or counter, and treble parts respectively. According to ancient practice, the clef is always placed upon a line, and never in a space. It deserves notice also, that the clef of fa is marked in three different ways: one in music, which is printed; another in music, which is written or engraven; and a third, in the full harmony of the chorus. By adding four lines above the clef of sol, and three lines beneath the clef of fa, which gives both above and below the greatest extent of permanent or established lines, it appears, that the whole scale of notes which can be placed upon the gradations relative to these clefs amounts to 24; that is to say, three octaves and a fourth from the F, or fa, which is found beneath the first line, to the si, or B, which is found above the last, and all this together forms what we call the general claviary; from whence we may judge, that this compass has, for a long time, constituted the extent of the system. But as at present it is continually acquiring new degrees, as well above as below, the degrees are marked by leger lines, which are added above or below as occasion requires.

Whatever may be the character and genius of any voice or instrument, if its extent above or below does not surpass that of the general claviary, in this number may be found a station and clef suitable to it; and there are, in reality, clefs determined for all the parts in music. If the extent of a part is very considerable, so that the number of lines necessary to be added above or below may become inconvenient, the clef is then changed in the course of the music. It may be plainly perceived what clef is necessary to choose, for raising or depressing any part, under whatever clef it may be actually placed. It will likewise appear, that, in order to adjust one clef to another, both must be compared by the general claviary, by means of which we may determine what every note under one of the clefs is with respect to the other. It is by this exercise repeated that we acquire the habit of reading with ease all the parts in any clef whatever.

CLEFT. *part. pass.* (from *cleave.*) Divided; parted asunder (*Milton*).

CLEFT. *s.* (from *cleave.*) A space made by the separation of parts; a crack (*Woodward*).

To CLE'FTGRAFT. *v. a.* (*cleft* and *graft.*) To engraft by cleaving the stock of a tree, and inserting a branch (*Mortimer*).

CLEIDO-MASTOIDEUS. In anatomy. See STERNO-CLEIDO-MASTOIDEUS.

CLEIS (from κλειδω, to shut.) 1. In anatomy, the clavicle. 2. A part of many compound terms in anatomy and surgery, in which it uniformly imports obstruction or shutting up.

CLEMA, in antiquity, a twig of the vine which served as a badge of the centurion's office.

CLEMATIS, (*clematis*, κληματις; from κλημα, a tendril, so named from its climbing up trees, or any thing it can fasten upon with its tendrils.) Virgin's bower; traveller's joy. In botany, a genus of the class polyandria, order polygynia. Calyxless; petals from four to six; seeds tailed; receptacle capitate. Twenty-four species: some climbing, others erect, and scattered over the globe, yet chiefly natives of the south of Europe. Those mostly worthy of notice are,

1. C. vitalba, with pinnate leaves; heart-shaped leaflets, climbing by the petioles up whatever stock or stem it lies within the reach

of. It is the only species indigenous to our own country, and is found wild in our hedges.

2. C. flammula: a native of the south of France, with lower leaves pinnate and jagged; upper ones simple, very entire, lanceolate. This is also a climbing plant.

3. C. erecta. Upright virgin's-bower. A native of the south of Europe; erect, as its specific name imports; with leaves pinnate; leaflets ovate-lanceolate, very entire; flowers four or five petals. It was formerly much celebrated as an anti-siphilitic under the name of FLAMMULA JOVIS, which see.

CLE'MENCY. *s.* (*clemence*, French; *clementia*, Latin.) 1. Mercy; remission of severity (*Addison*). 2. Mildness; softness (*Dryden*).

CLEMENS (Romanus), bishop of Rome, where he is said to have been born; and to have been fellow-labourer with St. Peter and St. Paul. We have nothing remaining of his works that is clearly genuine, excepting one epistle, written to quiet some disturbances in the church of Corinth; which, next to holy writ, is esteemed one of the most valuable remains of ecclesiastical antiquity.

CLEMENS (Alexandrinus), so called to distinguish him from the former, was an eminent father of the church, who flourished at the end of the second and beginning of the third centuries. He was the scholar of Pantænus, and the instructor of Origen. The best edition of his works is that in two vols. folio, published in 1715, by archbishop Potter.

CLEMENT V. (Pope), the first who made a public sale of indulgences. He transplanted the holy see to Avignon in France; greatly contributed to the suppression of the knights templars; and was author of a compilation of the decrees of the general councils of Vienna, styled Clementines. He died in 1314. There have been fourteen popes of this name, the last of whom died in 1775.

CLEMENT. *a.* (*clemens*, Latin.) Mild; gentle; merciful; kind (*Shakspeare*).

CLEMENTINE, a term used among the Augustins, who apply it to a person, who, after having being nine years a superior, ceases to be so, and becomes a private monk, under the command of a superior.

The word has its rise hence, that pope Clement, by a bull, prohibited any superior among the Augustins from continuing above nine years in his office.

CLEMENTINES, in the canon law, are the constitutions of pope Clement V. and the canons of the council of Vienne.

CLEOBULUS, one of the seven wise sages of Greece. He went into Egypt to learn the philosophy of that people, and was the intimate friend of Solon. He died about 560 B.C. His daughter Cleobulina was distinguished both by her talents and her personal charms. She composed enigmas.

CLE'OME. In botany, a genus of the class tetradynamia, order siliquosa. Silique one-celled, two-valved; all the petals ascending; glands three at each division of the calyx except the lowest. Twenty-three species; chiefly of the East and West Indies. They are all herbaceous plants, rising from one to two feet high, ornamented with beautiful red, yellow, or pink-coloured corols. They are easily propagable by seeds.

CLEOMENES, a name common to three Spartan kings, the most famous of whom was the 3d, who succeeded his father Leonidas. He was of an enterprising spirit, and resolved to restore the ancient discipline of Lycurgus in its full force, by banishing luxury and intemperance. He killed the Ephori, and removed by poison his royal colleague Eurydamides, and made his own brother, Euclidas, king, against the laws of the state, which forbade more than one of the same family to sit on the throne. He made war against the Achæans, and attempted to destroy their league. Aratus, the general of the Achæans, who supposed himself inferior to his enemy, called Antigonus to his assistance; and Cleomenes, when he had fought the unfortunate battle of Sellasia, B.C. 222, retired into Egypt, to the court of Ptolemy Evergetes, where his wife and children had gone before him. Ptolemy received him with great cordiality; but his successor, weak and suspicious, soon expressed his jealousy of this noble stranger, and imprisoned him. Cleomenes killed himself, and his body was flea'd and exposed on a cross, B.C. 219. (*Polyb.* &c.) —There were others also of this name, but of inferior note.

CLEON, a name common to many eminent Greeks, the most famous of whom is an Athenian, who, though originally a tanner, became general of the armies of the state, by his intrigues and eloquence. He took Thoron in Thrace, and was killed at Amphipolis, in a battle with Brasidas the Spartan general, 422 B. C. (*Thucyd.*).

CLEONIA. In botany, a genus of the class didynamia, order gymnospermia. Filaments forked; one point bearing the anthers on its tip; stigma four-cleft. One species only; a native of Portugal.

CLEOPATRA, queen of Egypt, was the daughter of Ptolemy Auletes. She obtained the love of Julius Cæsar, by whom she had a son, named Cæsareon. After the death of that prince, Mark Anthony marching against the Parthians, in the fortieth year before the Christian æra, ordered Cleopatra to meet him in Cilicia, to answer the accusations formed against her, in relation to her having given succours to Brutus. That princess, who was not only a great beauty, but also extremely artful, and spoke several languages, resolved to inspire Anthony with a passion for her. She embarked on the river Cydnus, in a vessel with a gilt stern; the sails of which were of purple, and the oars silver; which kept time with a concert of music, while she herself lay under a pavilion of cloth of gold, dressed in a magnificent habit. The very evening in which she arrived, she gave an elegant repast to Anthony, who became so distractedly in love, that he married her, notwithstanding his former marriage to Octavia, the sister of Augustus. After

Anthony's defeat and death, Cleopatra, unable to captivate the affections of Augustus, and fearing she should be carried to Rome, to adorn his triumph, caused herself to be stung by an asp, and died of the wound, in the thirty-ninth year of her age, and thirty years before the Christian æra. Augustus ordered her a magnificent funeral, and her body, as she desired, was buried in the same tomb with that of Anthony. She reigned twenty-two years.

She was a woman of great parts, notwithstanding her vices, and spoke many languages with the utmost facility; for she could converse with the Ethiopians, Troglodites, Jews, Arabians, Syrians, Medes, and Persians, without an interpreter, and always answered them in their own languages. In her death ended the reign of the family of Ptolemies in Egypt, after it had subsisted from the death of Alexander, two hundred and ninety-four years; for after this, Egypt was reduced to a Roman province, and so remained for six hundred and seventy years, till it was taken from them by the Saracens.

CLEOSTRATUS, a celebrated astronomer, born in Tenedos, was, according to Pliny, the first who proposed the signs of the zodiac; others say, that he only invented the signs Aries and Sagittarius. He also corrected the errors of the Grecian year about the 306th before Christ.

To CLEPE. *v. a.* (clypan, Saxon.) To call (*Shakspeare*).

CLEPSYDRA, an instrument or machine serving to measure time by the fall of a certain quantity of water. The word comes from *κλεπτω, condo, υδωρ, aqua*, water; though there have likewise been clepsydræ made with mercury. The Egyptians, by this machine, measured the course of the sun. Tycho Brahe, in later days, made use of it to measure the motion of the stars, &c. and Dudley used the same contrivance in making all his maritime observations. The use of clepsydræ is very ancient; they were invented in Egypt under the Ptolemies; as were also sun-dials. Their use was chiefly in the winter; the sun-dials served in the summer. They had two great defects; the one, that the water ran out with a greater or less facility, as the air was more or less dense; the other, that the water ran more readily at the beginning than towards the conclusion.

The construction of a common clepsydra.—To divide any cylindrical vessel into parts, to be emptied in each division of time, the time wherein the whole, and that wherein any part is to be evacuated, being given. Suppose a cylindrical vessel, whose charge of water flows out in twelve hours, were required to be divided into parts, to be evacuated each hour. 1. As the part of time 1 is to the whole time 12, so is the same time 12 to a fourth proportional 144. 2. Divide the altitude of the vessel into 144 equal parts: here the last will fall to the last hour; the three next above to the last part but one; the five next to the tenth hour; lastly, the twenty-three last to the first hour. For since the times increase in the series of the natural numbers 1, 2, 3, 4, 5, &c. and the altitudes, if the numeration be in a retrograde order from the twelfth hour, increase in the series of the unequal numbers 1, 3, 5, 7, 9, &c. the altitudes computed from the twelfth hour will be as the squares of the times 1, 4, 9, 16, 25, &c. Therefore the squares of the whole time, 144, comprehend all the parts of the altitude of the vessel to be evacuated. But a third proportional to 1 and 12 is the square of 12, and consequently it is the number of equal parts in which the altitude is to be divided, to be distributed according to the series of the unequal numbers, through the equal interval of hours. There were many kinds of clepsydræ among the ancients; but they all had this in common, that the water ran generally through a narrow passage, from one vessel to another, and in the lower was a piece of cork or light wood, which, as the vessel filled, rose up by degrees, and showed the hour.

Clepsydræ have been much improved of late years in their construction; but as their use is now superseded by the accuracy of our modern time-pieces, we shall not dwell longer upon them here, but shall refer to vols. 1 and 7 of the machines approved by the French Academy, and to the 44th vol. of the Philosophical Transactions, for descriptions of the best instruments of this kind with which we are acquainted.

CLERC (John le), called Chevalier, an eminent historical painter, was born at Nanci in 1587, but studied in Italy, where he resided for twenty years; and was a disciple of Carlo Venetiano, with whom he worked a long time, and whose style he so effectually studied and imitated, that several of the pictures which were finished by le Clerc were taken for the work of Venetiano. He was most highly esteemed at Venice for his extraordinary merit; and as a token of public respect, he was made a knight of St. Mark. His freedom of hand was remarkable; he had a light pencil; and in his colouring he resembled his master. He died in 1633.

Clerc (John le), an eminent writer; born at Geneva in 1657. His father was a physician, and Greek professor in the university. After going through a proper course of study, he was ordained a minister; but having embraced the Arminian doctrines he resolved to leave his native country, and in 1682 he went to London, from whence he passed over to Holland, and became professor of philosophy, Hebrew, and belles-lettres at Amsterdam. In 1696 he published his Ars Critica, a work of great taste and erudition. In 1706 appeared his edition of Menander and Philemon, which was severely attacked by Burman and Bentley, two learned but not polite critics. He died in 1736. His works are too numerous to be mentioned. They all shew a great judgment, keen penetration, and a wonderful extent of reading; but they also shew marks of hastiness, and no little portion of vanity. (*Watkins*).

Clerc (Sebastian le), a French artist of

eminence; born in 1637, and died in 1717. Pope Clement XI. made him a Roman knight, and Lewis XIV. appointed him his engraver in ordinary. He engraved above 3000 pieces, and was the author of, 1. A Treatise of Geometry, 8vo.; 2. A Treatise on Architecture, 2 vols. 4to; 3. Another on Perspective.

Clerc (George le) count de Buffon. See Buffon.

CLERGY, Clerus, the assembly or body of clerks, or ecclesiastics; in contradistinction to the laity. See Clerk.

In the Romish church there are two kinds of clergy: the one regular, comprehending all the religious of both sexes: the other secular, comprehending all the ecclesiastics that do not take the monastic vows.

Among the reformed, there are none but secular clergy. The Roman clergy forms a monarchical state, under the pope, as its supreme head.

The clergy was anciently divided into three orders; viz. priests, deacons, and inferior clerks; and each order had its chief: the arch-priest was the head of the first order, the arch-deacon of the second, and the dean of the third.

Under the name of clergy were also formerly comprised all the officers of justice; as being supposed to be men of letters.

Though the clergy formerly claimed an exemption from all secular jurisdiction, yet Matt. Paris tells us, William the Conqueror subjected the bishops and abbots who held *per baroniam*, and who, till then, had been exempt from all secular service; and ordered they should be no longer free from mortuary services. To this purpose he prescribed arbitrarily what number of soldiers every abbey and bishopric should provide, to serve him and his successors in war, and laid up the registers of ecclesiastical servitude in his treasury.

But, in effect, the clergy were not exempt from all secular service till then; as being bound by the laws of king Edgar to obey the secular magistrate in some things; viz. upon an expedition to the wars, and in contributing to the building and repairing of bridges, &c. See Trinoda necessitas.

The privileges of the English clergy, by the ancient statutes, are very considerable: their goods are to pay no toll in fairs or markets; they are exempt from all offices but their own; from the king's carriages, posts, &c. from appearing at sheriffs' tourns, or frankpledges; and are not to be fined or amerced according to their spiritual, but their temporal means. A clergyman acknowledging a statute, his body is not to be imprisoned. If he is convicted of a crime for which the benefit of clergy is allowed, he shall not be burnt in the hand: and he shall have the benefit of clergy in infinitum, which no layman can have more than once. The clergy, by common law, are not to be burdened in the general charges of the laity, nor to be troubled nor encumbered, unless expressly named and charged by the statute; for general words do not affect them. Thus, if a hundred is sued for a robbery, the minister shall not contribute; neither shall they be assessed to the highway, to the watch, &c.

The revenues of the clergy were anciently more considerable than at present. Ethelwolf, in 855, gave them a tythe of all goods, and a tenth of all the lands in England, free from all secular services, taxes, &c. The charter whereby this was granted them was confirmed by several of his successors: and William the Conqueror, finding the bishoprics so rich, created them into baronies, each barony containing thirteen knight's fees at least: but since the Reformation the bishoprics are much impoverished. The revenues of the inferior clergy, in general, are small; a third part of the best benefices being anciently, by the pope's grant, appropriated to monasteries, upon the dissolution thereof became a lay-fee. See Benefice.

Clergy, *Privilegium clericale*, or benefit of clergy, denotes an ancient privilege of the church, consisting in this, that places consecrated to religious duties were exempted from criminal arrests, whence proceeded sanctuaries; and that the persons of clergymen were exempted from criminal process before the secular judges in particular cases. This, at first, was an indulgence granted by the civil government, but it was afterwards claimed as an inherent, indefeasible, and *jure divino* right: and the clergy endeavoured to extend the exemption not only to almost all kinds of crimes, but to a variety of persons, besides those who were properly of their own order. In England, though this privilege was allowed in some capital cases, it was not universally admitted. The method of granting it was settled in the reign of Henry VI. which required, that the prisoner should first be arraigned, and then claim his benefit of clergy, by way of declinatory plea, or, after conviction, by way of arrest of judgment; which latter mode is most usually practised. This privilege was originally confined to those who had the *habitum et tonsuram clericalem:* but in process of time every one was accounted a clerk, and admitted to this benefit, who could read; so that, after the invention of printing, and the dissemination of learning, this became a very comprehensive test, including laymen as well as divines.

This privilege was formerly admitted, even in cases of murder; but the ancient course of the law is much altered upon this head. By the statute of 18 Eliz. cap. vii. clerks are no more committed to their ordinary to be purged; but every man to whom the benefit of clergy is granted, though not in orders, is put to read at the bar, after he is found guilty and convicted of such felony, and so burnt in the hand, and set free for the first time, if the ordinary or deputy standing by, do say, Legit ut clericus: otherwise he shall suffer death.

It appears by our law-books, that laymen that could read had the privilege of the clergy ever since 25 Edw. III. which allowance never was condemned in parliament, but rather approved of.

It is natural to ask for what crimes the pri-

vilegium clericale, or benefit of clergy, is to be allowed. And it is to be observed, that neither in high treason, nor in petit larceny, nor in any mere misdemeanors, it was indulged at the common law: and therefore we may lay it down as a rule, that it was allowable only in petit treason, and capital felonies; which for the most part became legally entitled to this indulgence, by the statute *de clero*, 25 Edw. III. stat. 3. c. 4. which provides, that clerks convict for treason or felonies, touching other persons than the king himself or his royal majesty, shall have the privilege of holy church. But yet it was not allowed in all cases whatsoever: for in some it was denied even in common law, viz. *insidiatio viarum*, or lying in wait for one on the highway; *depopulatio agrorum*, or destroying and ravaging a country; and *combustio domorum*, or arson, that is, burning of houses; all which are a kind of hostile acts, and in some degree border upon treason. And further, all these identical crimes, together with petit treason, and very many other acts of felony, are ousted of clergy by particular acts of parliament.

Upon the whole, we may observe the following rules: 1. That in all felonies, whether new created, or by common law, clergy is now allowable, unless taken away by act of parliament. 2. That where clergy is taken away from the principal, it is not of course taken away from the accessory, unless he be also particularly included in the words of the statute. 3. That when the benefit of clergy is taken away from the offence (as in case of murder, buggery, robbery, rape, and burglary), a principal in the second degree, being present, aiding and abetting the crime, is as well excluded from his clergy as he that is a principal in the first degree: but, 4. That where it is only taken away from the person committing the offence (as in the case of stabbing, or commiting larceny in a dwelling-house), his aiders and abettors are not excluded, through the tenderness of the law, which hath determined that such statutes shall not be taken literally.

Lastly, We enquire what the consequences are to the party of allowing him this benefit of clergy? We speak not of the branding, imprisonment, or transportation; which are rather concomitant conditions, than consequenees, of receiving this indulgence. The consequences are such as affect his present interest, and future credit and capacity: as having been once a felon, but now purged from that guilt by the privilege of clergy; which operates as a kind of statute pardon. And we may observe, 1. That, by his conviction, he forfeits all his goods to the king; which, being once vested in the crown, shall not afterwards be restored to the offender. 2. That, after conviction, and till he receives the judgment of the law by branding or the like, or else is pardoned by the king, he is, to all intents and purposes, a felon; and subject to all the disabilities and other incidents of a felon. 3. That, after burning or pardon, he is discharged for ever of that, and all other felonies before committed, within the benefit of clergy; but not of felonies from which such benefit is excluded: and this, by statutes 8 Eliz. c. 4. and 18 Eliz. c. 7. 4. That, by the burning, or pardon of it, he is restored to all capacities and credits, and the possession of his lands, as if he had never been convicted. 5. That what is said with regard to the advantages of commoners and laymen, subsequent to the burning in the hand, is equally applicable to all peers and clergymen, although never branded at all. For they have the same privileges, without any burning, to which others are entitled after it.

CLE'RGYMAN. *s.* A man in holy orders; not a layman. The word is generally confined in its application to those who discharge the pastoral functions in established churches, while those who officiate among nonconformists are called dissenting ministers. There seems, however, no just foundation for the distinction: for the word *clerk*, originally appropriated to the clergy, is from the Greek κληρος, chosen; and the appointment of pastors among the dissenters is generally a matter of free choice with those who are to be instructed by them; whereas in most establishments the appointment of the clergyman is completely independent of the will of the parishioners.

CLE'RICAL. *a.* (*clericus*, Latin.) Relating to the clergy (*Bacon*).

CLERK. *s.* (cleric, Saxon.) 1. A clergyman (*Ayliffe*). 2. A scholar; a man of letters (*South*). 3. A man employed under another as a writer (*Shakspeare*). 4. A petty writer in publick offices; an officer of various kinds (*Arbuthnot*). 5. The layman who reads the responses of the congregation in the church, to direct the rest.

Under the 4th acceptation of the word, it is necessary to specify a few particulars. As,

CLERK *of the Bails*, an officer in the court of king's bench, whose business is to file all bail-pieces taken in that court, where he always attends.

CLERK *of the Check*, an officer belonging to the king's court; so called, because he has the check and controlment of the yeomen that belong to the king, queen, or prince. He likewise, by himself or deputy, sets the watch in the court. There is also an officer in the navy of the same name, belonging to the king's yards.

CLERK *of the Crown*, an officer in the king's bench, who frames, reads, and records all indictments against offenders there arraigned or indicted of any public crime. He is likewise termed clerk of the crown office, in which capacity he exhibits information by order of the court for various offences.

CLERK *of the Crown*, in chancery, an officer whose business it is constantly to attend the lord chancellor in person or by deputy; to write and prepare for the great seal special matters of state by commission, both ordinary and extraordinary.

CLERK-*Comptroller of the King's Household*, an officer of the king's court, authorised to allow or disallow the charges of pursuivants,

messengers of the green cloth, &c. to inspect and control all defects of any of the inferior officers; and to sit in the counting-house with the lord steward and other officers of the household for regulating such matters.

Clerk *of the Deliveries*, an officer of the Tower, whose function is to take indentures for all stores and ammunition issued from thence.

Clerk *of the Errors*, in the court of common pleas, an officer who transcribes and certifies into the king's bench, the tenor of the record of the action on which the writ of error, made out by the cursitor, is brought there to be determined. In the king's bench the clerk of the errors transcribes and certifies the records of causes, by bill, in that court, into the exchequer: and the business of the clerk of the errors in the exchequer is to transcribe the records certified thither out of the king's bench, and to prepare them for judgment in the exchequer-chamber.

Clerk *of the Essoins*, in the court of common pleas, keeps the essoin roll, or enters essoins: he also provides parchment, cuts it into rolls, marks the number on them, delivers out all the rolls to every officer, and receives them again when written. See Essoin.

Clerk *of the Estreats*, an officer in the exchequer, who every term receives the estreats out of the lord treasurer's remembrancer's office, and writes them out to be levied for the crown.

Clerk *of the Hamper*, or *Hanaper*, an officer in chancery, whose business is to receive all money due to the king for the seals of charters, letters patent, commissions and writs; also the fees due to the officers for enrolling and examining them.

Clerk *of the Enrolments*, an officer of the court of common pleas, that enrols and exemplifies all fines and recoveries, and returns writs of entry.

Clerk *of the Juries*, an officer of the common pleas, who makes out the writs called habeas corpus and distringas, for juries to appear either in that court, or at the assises, after the pannels are returned upon the *venire facias*. He likewise enters into the rolls the awarding these writs, and makes all the continuances till verdict is given.

Clerk *of the Market*, an officer of the king's house, to whom is given the charge of the king's measures and weights, the standards of those that ought to be used all over England.

Clerk *of the Ordnance*, an officer that registers all orders concerning the king's ordnance in the tower.

Clerk *of the Outlawries*, an officer of the common pleas, and deputy to the attorney general, for making out all writs of capias utlagatum, after outlawry, to which there must be the king's attorney's name.

Clerk *of the Paper-office*, an officer belonging to the king's bench, whose business is to make up the paper-books of special pleadings in that court.

Clerk *of the Parliament*, is an officer who records all things done in parliament; and engrosses them fairly into parchment rolls, for the better preservation of them to posterity. Of these there are two: one of the house of lords, and the other of the house of commons.

Clerk *of the Peace*, is an officer belonging to the session of the peace, whose duty is at the session to read the indictments, to enrol the acts, and draw the processes: also to certify in the king's bench transcripts of indictments, outlawries, attainders, and convictions, had before the justices of the peace within the time limited by statute.

Clerk *of the Pells*, an officer that belongs to the exchequer, whose business is to enter every teller's bill into a parchment roll, called pellis receptorum, and to make another roll of payments, called pellis exituum.

Clerk *of the petty Bag*, an officer of the court of chancery, whereof there are three, the master of the rolls being the chief: their business is to record the return of all inquisitions out of every shire, to make out patents of customers, gaugers, comptrollers, &c. liberates upon extents of statutes staple, conge d'elires for bishops, summons of the nobility, clergy, and burgesses to parliament, and commissions directed to knights, and others, of every shire, for assessing subsidies and taxes.

Clerk *of the Pipe*, an officer of the exchequer, who having the accounts of all debts due to the king, delivered out of the remembrancer's office, charges them in a great roll folded up like a pipe.

Clerks *of the Privy-seal*, four officers that attend the lord privy seal, for writing and making out all things that are sent by warrant from the signet to the privy seal, and to be passed the great seal; and likewise to make out privy seals, upon special occasions of his majesty's affairs, as for loan of money, or the like.

Clerk *of the Rolls*, an officer of the chancery, whose business is to make searches after, and copies of deeds, officers, &c.

Clerk *of the Signet*, is an officer continually attending on the king's principal secretary; who has custody of the privy-signet, as well for sealing the king's private letters, as for such grants as pass his majesty's hands by bills signed. Of these there are four, who attend in their turn, and have their diet at the secretary's table.

Clerk *of the Treasury*, an officer of the common pleas, who has charge of the records of the *nisi prius*, the fees due for all searches, and the certifying of all records into the king's bench, when a writ of error is brought. He also makes out all writs of supersedeas de non molestanda, which are granted for the defendants while the writ of error is depending; and all exemplifications of records, being in the treasury.

Clerk *of the Warrants*, is an officer belonging to the court of common-pleas, who enters all warrants of attorney for plaintiff and defendant; and enrols all deeds of indentures of bargain and sale, which are acknowledged in the

court, or before any judges out of the court; and it is his office to estreat into the exchequer all issues, fines, and amerciaments, which grow due to the king in that court, for which he has a standing fee or allowance.

CLE'RKSHIP. *s.* (from *clerk.*) 1. Scholarship. 2. The office of a clerk of any kind (*Swift*).

CLERMONT, the name given to three towns of France, the most considerable of which is a bishop's see in the department of Puy de Dome, and late province of Auvergne. It is seated on an eminence, and is often called Clermont Ferrand, in consequence of its being united to the town of Mount Ferrand to the N.E. Many Roman antiquities are found in the neighbourhood, and it is generally allowed to be the Avernæ of the ancients. It was the birth-place of the celebrated Paschal. Lat. 45. 47 N. Lon. 3. 10 E.

CLERMONT MANUSCRIPT, is a copy of St. Paul's epistles, found in the monastery of Clermont, and used by Beza, together with the Cambridge MS. in preparing his edition of the New Testament. This copy is in the octavo form, and is written on fine vellum in Greek and Latin, with some mutilations. Beza supposes that it is of equal antiquity with the Cambridge copy; but both were probably written by a Latin scribe in a later period than he assigns to them.

CLERODE'NDRON. In botany, a genus of the class didynamia, order angiospermia. Calyx five-cleft, campanulate; corol with a filiform tube, and five-parted equal border; stamens very long, placed between the segments of the corol, which gape widely; drupe four-seeded, bearing a one-celled nut. Eight species—all natives of the East-Indies; some of them trees, with elegant terminal panicles, and scarlet flowers; others shrubs with white flowers, with a slender tube.

CLEROMANCY, a kind of divination performed by throwing dice, or little bones, and observing the points or marks turned up.

CLEROTI, public arbitrators among the Athenians.

CLE'RUS. In the Fabrician system of entomology, a tribe of the genus attelabus of coleopterous insects. See ATTELABUS.

CLESIDES, a Greek painter, about 276 years before Christ, who revenged the injuries he had received from queen Stratonice, by representing her in the arms of a fisherman. However indecently the painter might represent the queen, she was drawn with such personal beauty, that she preserved the piece, and liberally rewarded the artist.

CLE'THRA. In botany, a genus of the class decandria, order monogynia. Calyx five-parted; petals five; stigma three-cleft; capsule three-celled, three-valved. Four species, chiefly natives of North America.

The species most commonly propagated, and most deserving of propagation among ourselves, is c. alnifolia, a native of Virginia, with leaves obovate, serrate, slightly pubescent underneath; raceme simple, bracted. This beautiful shrub, in moist situations, which it prefers, rises to about eight or ten feet high: its leaves resemble the alder, whence its specific name; and its flowers are produced in close spikes at the end of the branches, and are elegantly white.

CLEVE, CLIF, CLIVE. At the beginning or end of the proper name of a place, denotes it to be situated on the side of a rock or hill.

CLEVELAND, a district of England, in the county of York, on the borders of Durham.

CLE'VER. *a.* 1. Dexterous; skilful (*Addison*). 2. Just; fit; proper; commodious (*Pope*). 3. Well-shaped; handsome (*Arbuthnot*).

CLE'VERLY. *ad.* (from *clever.*) Dexterously; fitly; handsomely (*Hudibras*).

CLE'VERNESS. *s.* (from *clever.*) Dexterity; skill; accomplishment.

CLEVES, a town of Westphalia, in Germany, belonging to the king of Prussia. In the citadel is an inscription setting forth that Caius Julius Cæsar was the founder, in the year 698 from the building of Rome. It is 60 miles S. E. of Amsterdam. Lat. 51. 5 N. Lon. 5. 50 E.

CLEW. *s.* (clype, Saxon.) 1. Thread wound upon a bottom (*Roscommon*). 2. A guide; a direction (*Smith*).

To CLEW. *v. n.* *To clew the Sails*, is to raise them, in order to be furled.

CLIBADIUM. In botany, a genus of the class monoecia, order pentandria. Male: calyx common, imbricate; florets of the ray female three or four; seed an umbilicate drupe. One species only; a native of Surinam, with opposite peduncles; and common-calyx violet hued when ripe.

To CLICK. *v. n.* (*clicken*, Dutch.) To make a sharp, small, successive noise (*Gay*).

CLI'CKER. *s.* The servant of a salesman, who stands at the door to invite customers.

CLI'CKET. *s.* The knocker of a door.

CLIENT, among the Romans, a citizen who put himself under the protection of some great man, who in respect of that relation was called patron. The term client is now used to denote a party in a law-suit, who has turned over the cause into the hands of a counsellor or solicitor.

CLI'ENT. *s.* (*cliens*, Latin.) 1. One who applies to an advocate for counsel and defence (*Taylor*). 2. A dependant (*Ben Jonson*).

CLI'ENTED. *part. a.* Supplied with clients (*Carew*).

CLIENTE'LE. *s.* (*clientela*, Latin.) The condition or office of a client (*Ben Jonson*).

CLI'ENTSHIP. *s.* (from *client.*) The condition of a client (*Dryden*).

CLIFF. *s.* (*clivus*, Latin, clif, Saxon.) A steep rock; a rock broken and craggy (*Bacon*).

CLIFF, or KING'S CLIFF, a small town in Northamptonshire, having a market on Tuesdays. Lat. 52. 33 N. Lon. 0. 37 W.

CLIFFORTIA. In botany, a genus of the class dioecia, order polyandria. Calyx three-leaved, superior; corolless, female: styles two; capsule two-celled; seeds solitary. Nineteen species—all Cape plants and beautiful ever-

greens, rising to the height of four or five feet; some with simple, and others with compound leaves. They may be best propagated by cuttings, and if the cuttings be made in spring or summer, and plunged into a hot-bed, they will soon throw forth radicles.

CLIMACTERIC, among physicians and astrologers (from *climacter*, a ladder), a critical year in a person's life. According to some, this is every seventh year; but others allow only those years produced by multiplying 7 by the odd number 3, 5, 7, and 9, to be climacterical. These years, they say, bring with them some remarkable change with respect to health, life, or fortune: the grand climacteric is the 63d year; but some, making two, add to this the 81st: the other remarkable climacterics are the 7th, 21st, 35th, 49th, and 56th.

CLIMATE, or CLIME, in geography, a part of the surface of the earth, bounded by two lesser circles parallel to the equator; and of such a breadth, as that the longest day in the parallel nearer the pole exceeds the longest day in that next the equator, by some certain space, as half an hour, or an hour, or a month.

The beginning of a climate, is a parallel circle in which the day is the shortest; and the end of the climate, is that in which the day is the longest. The climates therefore are reckoned from the equator to the pole; and are so many zones or bands, terminated by lines parallel to the equator: though, in strictness, there are several climates, or different degrees of light or temperature, in the breadth of one zone. Each climate only differs from its contiguous ones, in that the longest day in summer is longer or shorter, by half an hour, for instance, in the one place than in the other.

As the climates commence in the equator, at the beginning of the first climate, that is, at the equator, the day is just 12 hours long; but at the end of it, or at the beginning of the 2d climate, the longest day is 12 hours and a half long; and at the end of the 2d, or beginning of the 3d climate, the longest day is 13 hours long; and so of the rest, as far as the polar circles, where the hour climates terminate, and month climates commence. And as an hour climate is a space comprised between two parallels of the equator, in the first of which the longest day exceeds that in the latter by half an hour; so the month climate is a space contained between two circles parallel to the polar circles, and having its longest day longer or shorter than that of its contiguous one, by a month, or 30 days. But some authors, as Ricciolus, make the longest day of the contiguous climates to differ by half hours, to about the latitude of 45 degrees; then to differ by an hour, or sometimes two hours, to the polar circle; and after that by a month each. See tables of climates in Varenius, chap. 25, prop. 13.

Vulgarly the term climate is bestowed on any country or region differing from another, either in respect of the seasons, the quality of the soil, or even the manners of the inhabitants, without any regard to the length of the longest day.

CLIMATES (Different temperature of). The presence of the sun is one of the principal sources of heat, and its absence the cause of cold; and were these the only sources of heat and cold, in the same parallel of latitude there would be the same degree of heat or cold at the same season; but this is found to be contrary to matter of fact: the temperature of the eastern coast of North America is much colder than the western coast of Europe, under the same latitude. Very hot days are frequently felt in the coldest climates; and very cold weather, even perpetual snow, is found in countries under the equator. We must therefore seek for other causes of heat and cold, and these must evidently be partly local.

One great source of heat is from the earth; whether this arises from any central fire, or from a mass of heat diffused through the earth, it is not perhaps easy to say; the latter cause is perhaps the most probable; and in this case, the heat which is thus gradually lost is renewed again by the sun. This heat imparted from the earth to the atmosphere, tends greatly to moderate the severity of the winter's cold. It is found by observation, that the same degree of heat resides in all subterraneous places at the same depth, varying a little at different depths, but is never less than 36° of Fahrenheit's thermometer. There is however an exception to this in mines, where there are probably some chemical operations going forwards. Mr. Kirwan, in his Estimate of the Temperature of different Latitudes, and to whom we are principally indebted for what we shall here give upon this subject, observes, that at 80 or 90 feet (if this depth have any communication with the open air, and perhaps at a much less depth, if there be no such communication) the temperature of the earth varies very little, and generally approaches to the mean annual heat. Thus the temperature of springs is nearly the same as the mean annual temperature, and varies very little in different seasons. The temperature of the cave at the observatory at Paris is about $53\frac{1}{2}$ degrees, and varies about half a degree in very cold years; its depth is about 90 feet. The internal heat of the earth in our climate is always above 40°, and therefore the snow generally begins to melt first at the bottom. The next source of heat is the condensation of vapour. It is well known that vapour contains a great quantity of heat, which produces no other effect but that of making it assume an aërial, expanded state, until the vapour is condensed into a liquid; during which condensation, a certain quantity of heat escapes, and warms the surrounding atmosphere. This condensation is frequently formed by the attraction of an electrical cloud, and hence arises the great sultriness which we frequently experience before rain, and particularly before a thunder storm.

As the earth is one of the great sources of heat, warming the surrounding air, distance from the earth must be a source of cold; and thus we find that as you ascend in the atmosphere, the cold increases. In the vicinity of Paris, the temperature of the earth being 47°, at the estimated height of 11084 feet it was found to be 21°, or 11° below congelation, by M. Charles, who ascended in a balloon. And lord Mulgrave, at the bottom of Hackluyt-hill, lat 80°, found the temperature of the air 50°; but on the top, at the height of 1503 feet, only 42°. Hence we find, that the highest mountains, even under the equator, have their tops continually covered with snow. Mr. Bouguer found the cold of Pinchina, one of the Cordelieres,

immediately under the line, to extend from 7° to 9° below the freezing point every morning before sunrise; and hence at a certain height, which varies in almost every latitude, it constantly freezes at night all the year round, though in the warm climates it thaws in the same degree the next day. This height he calls the lower term of congelation: between the tropics he places it at the height of 15577 feet, English measure. The next great source of cold is evaporation. The same cause which makes the condensation of vapour a source of heat, makes evaporation the source of cold; as it absorbs the fire in the latter instance, which it gives out in the former: the heat thus absorbed is called latent heat, it producing, in that state, no sensation of warmth. At a certain height above the lower term of congelation it never freezes, not because the cold decreases, but because the vapours do not ascend so high; this height Mr. Bouguer calls the upper term of congelation, and under the equator he fixes it at the height of 28,000 feet. Mr. Kirwan has given us the following mean height of the upper and lower terms of congelation, for the latitude of every five degrees, in feet.

Lat.	Alt. lower Term.	Alt. upper Term.	Lat.	Alt. lower Term.	Alt. upp. Term.
0°	15577	28000	45°	7658	13730
5	15457	27784	50	6260	11253
10	15067	27084	55	4912	8830
15	14498	26061	60	3684	6546
20	13719	24661	65	2516	4676
25	12020	23423	70	1557	2809
30	11592	20838	75	748	1346
35	10664	19169	80	120	207
40	9016	16207			

Sometimes the temperature of the upper air is higher than that of the lower air, particularly when a large mass of vapours is condensed by electrical agency; for no part of the heat given out by that cause being lost by communication with air much colder, that which surrounds the vapours so condensed, must be heated to a considerable degree. The clouds by absorbing the sun's rays, are more heated than the clear air would be. These, and other circumstances, render the true height of the terms of congelation at any time subject to considerable uncertainty.

The clearing away of woods lessens the vapours, and consequently diminishes the quantity of rain, and increases the temperature. Several parishes in Jamaica which used to produce fine crops of sugar canes, are now dry for nine months in a year, and are turned into cattle-pens, through the clearing away of the woods. Hence, water is most plentiful in those countries where woods abound, and the best springs are there found. In America, since the woods in the neighbourhood of their towns have been cut down, many streams have become dry; and others have been reduced so low, as to cause great interruptions to the miller.

Of evaporation, the following facts may be observed. 1. That in our climates, evaporation is about four times as great from the 21st of March to the 21st of September, as from the 21st of September to the 21st of March. 2. That, other circumstances being the same, it is greater in proportion as the difference between the temperature of the air, and that of the evaporating surface is greater; and so much the smaller, as the difference is smaller; and therefore smallest, when the temperature of the air and evaporating liquor are equal. The former part of this proposition however requires some restriction; for if air be more than 15 degrees colder than the evaporating surface, there is scarce any evaporation; but on the contrary, it deposits its moisture on the surface of the liquor. 3. The degree of cold produced by evaporation is always much greater, when the air is warmer than the evaporating surface, than that which is produced when the surface is warmer than the air. Hence, warm winds, as the Sirocco and Harmatan, are more drying than cold winds. 4. Evaporation is more copious when the air is less loaded with vapours, and is therefore greatly promoted by cold winds flowing into warmer countries. 5. Evaporation is greatly increased by a current of air or wind flowing over the evaporating surface, because unsaturated air is constantly brought into contact wirh it. Hence, calm days are hottest, as has commonly been remarked. 6. Tracts of land covered with trees or vegetables emit more vapour than the same space covered with water. Mr. Williams (Philadelphia Transactions) found this quantity to amount to $\frac{1}{3}$ more. Hence the air about a wood or forest is made colder by evaporation from trees and shrubs, while the plants themselves are kept in a more moderate heat, and secured from the burning heat of the sun by the vapours perspired from the leaves. Thus, we find the shade of vegetables more effectual to cool us, as well as more agreeable, than the shade from rocks and buildings.

The heat and cold of different countries are transmitted from one to the other by the medium of winds.

From what has been observed it is manifest, that some situations are better fitted to receive or communicate heat than others; thus, high and mountainous situations being nearer to the source of cold than lower situations; and countries covered with woods, as they prevent the access of the sun's rays to the earth, or to the snow which they may conceal, and present more numerous evaporating surfaces, must be colder than open countries, though situated in the same latitude. And since all tracts of land present infinite varieties of situation, uniform results cannot here be expected. Mr. Kirwan observes, therefore, that it is on water only that we must seek for a standard situation with which to compare the temperature of other situations. Now the globe contains, properly speaking, but two great tracts of water, the Atlantic Ocean, and the Pacific Ocean; which may each be divided into north and south, as they lie on the northern or southern side of the equator. In this tract of water, he chose that situation for a standard which recommends itself most by its simplicity, and freedom from any but the most permanent causes of alteration of temperature; viz. that part of the Atlantic which lies between 80° north and 45° south latitude, and extending southwards as far as the Gulph Stream, and to within a few leagues of the coast of America; and that part of the Pacific Ocean which lies between 45° north and 40° south latitude, and from 20° to 275° east longitude. Within this space, the mean annual temperature will be found as expressed by the following table. The temperatures beyond 80° latitude are added, though not strictly within the standard.

A Table of the mean Annual Temperature of the standard situation, in every degree of Latitude.

Lat.	Temp.	Lat.	Temp.	Lat.	Temp.
0°	84	33°	68,3	62°	42,7
5	83,6	34	67,4	63	41,9
6	83,4	35	66,6	64	41,2
7	83,2	36	65,7	65	40,4
8	82,9	37	64,8	66	39,7
9	82,7	38	63,9	67	39,1
10	82,3	39	63	68	38,4
11	82	40	62	69	37,8
12	81,7	41	61,2	70	37,2
13	81,3	42	60,3	71	36,6
14	80,8	43	59,4	72	36
15	80,4	44	58,4	73	35,5
16	79,9	45	57,5	74	35
17	79,4	46	56,4	75	34,5
18	78,9	47	55,6	76	34,1
19	78,3	48	54,7	77	33,7
20	77,8	49	53,8	78	33,2
21	77,2	50	52,9	79	32,9
22	76,5	51	52,4	80	32,6
23	75,9	52	51,1	81	32,2
24	75,4	53	50,2	82	32
25	74,5	54	49,2	83	31,7
26	73,8	55	48,4	84	31,5
27	72,8	56	47,5	85	31,4
28	72,3	57	46,7	86	31,2
29	71,5	58	45,8	87	31,14
30	70,7	59	45,1	88	31,10
31	69,9	60	44,3	89	31,04
32	69,1	61	43,5	90	31

The rule by which this table has been computed, was given by the famous astronomer Tobias Mayer of Gottingen, and is as follows; it was constructed from knowing the mean annual temperatures of two latitudes. Let s be the sine of the latitude; then the mean annual temperature will be $84 - 53 \times s^2$; that is, from 84 subtract 53 multiplied into the square of the sine of the latitude, and the remainder is the mean annual temperature.

The temperatures of different years differ very little near the equator, but they differ more and more as you approach the poles.

It scarcely ever freezes in latitudes under 35°, except in high situations; and it scarcely ever hails in latitudes higher than 60°.

In latitudes between 35° and 60°, in places adjacent to the sea, it generally thaws when the sun's altitude is 40° or upwards: and seldom begins to freeze, until the sun's meridian altitude is below 40°.

The greatest cold in all latitudes in our hemisphere, is generally about half an hour before sunrise. The greatest heat in all latitudes between 60° and 45° is about half-past 2 o'clock in the afternoon; between latitudes 45° and 35°, about 2 o'clock; between latitudes 35° and 25°, about half-past 1 o'clock; and between latitude 25° and the equator, about 1 o'clock. On sea, the difference between the heat of day and night is not so great as on land, particularly in low latitudes.

In all latitudes, January is the coldest month. July is the warmest month in all latitudes above 48°; but in lower latitudes, August is the warmest. The temperature of April approaches more nearly to the mean annual temperature, than any other month.

In the highest latitudes we often meet with a heat of 75° or 80°; and in latitudes 59° and 60° the heat of July is frequently greater than in latitude 51°.

All countries lying to the windward of high mountains, or extensive forests, are warmer than those to the leeward in the same latitude.

The vicinity to the sea is another circumstance which affects the temperature of a climate; as it moderates the heat from the land, and brings the atmosphere down to a standard best fitted to the human constitution. In our hemisphere, countries which lie to the south of any sea, are warmer than those that have the sea lie to the south of them, because the winds that should cool them in winter are mitigated by passing over the sea; whereas those which are northward of the sea, are cooler in summer by the breezes from it. A northern or southern bearing off the sea, renders a country warmer than an eastern or western bearing.

Islands participate more of temperature arising from the sea, and are therefore warmer than continents.

The soils of large tracts of land have their share in influencing the temperature of the country: thus, stones and sand heat and cool more readily, and to a greater degree, than mould; hence, the violent heats in the sandy deserts of Arabia and Africa; and the intense cold of Terra del Fuego, and other stony countries in cold latitudes.

Vegetables considerably affect the temperature of a climate. Wooded countries are much colder than those which are open and cultivated.

Every habitable latitude enjoys a heat of 60° at least, for two months, and this is necessary for the growth and maturity of corn. The quickness of vegetation in the higher latitudes proceeds from the time the sun is above the horizon. Rain is but little wanted, as the earth is sufficiently moistened by the liquefaction of the snow that covers it during the winter. In this we cannot sufficiently admire the wise disposition of Providence.

It is owing to the same provident hand that the globe of the earth is intersected with seas and mountains, in a manner, that seems on its first appearance, altogether irregular and fortuitous; presenting to the eye of ignorance the view of an immense ruin: but when the effects of these seeming irregularities on the earth are carefully inspected, they are found most beneficial, and even necessary to the welfare of its inhabitants; for to say nothing of the advantages of trade and commerce, which could not exist without seas, we have seen that it is by their vicinity, that the cold of higher latitudes is moderated, and the heat of the lower. It is by the want of seas, that the interior parts of Asia, as Siberia and Great Tartary, as well as those of Africa, are rendered almost uninhabitable; a circumstance which furnishes a strong prejudice against the opinion of those, who think those countries were the original habitations of man.

In the same manner, mountains are necessary; not only as the reservoirs of rivers, but as a defence against the violence of heat in the warm latitudes; without the Alps, Pyrenees, Apennines, the mountains of Dauphine, Auvergne, &c. Italy, Spain, and France would be deprived of the mild temperature which they now enjoy. Without the Balgate Hills, or Indian Appennine, India would have been a desert. Hence, Jamaica, St. Domingo, Sumatra, and most other islands between the tro-

pics, are furnished with mountains, from which the breezes proceed which refresh them.

The annual heat of London and Paris is nearly the same; but from the beginning of April to the end of October, the heat is greater at Paris than at London. Hence, grapes arrive at greater perfection in the neighbourhood of Paris than about London.

The following table contains a comparison of the temperature of London with several other places. The first column contains the place; the second, the annual temperature; the third, the temperature of January, that being the coldest month; and the fourth, the temperature of July; that at London as the standard, being estimated at 1000. The degree of cold is estimated in the third column, and the degree of heat in the fourth and second.

Places.	An. Temp.	Temp. Jan.	Temp. July.
London	1000	1000	1000
Paris	1028	1040	1037
Edinburgh	923	1040	914
Berlin	942		
Stockholm	811	1583	964
Petersburgh	746	3590	1008
Vienna	987	1305	1037
Pekin	1067	1730	1283
Bourdeaux	1090	925	1139
Montpellier	1170	850	1196
Madeira	1309	559	1128
Spanish Town in Jamaica	1557		
Madrass	1565	491	1349

At London, by a mean of the observations made at the Royal Society from 1772 to 1780, it appears that the mean annual temperature is 51°,9, or in whole numbers, 52°; and the monthly temperature is as follows:

January	35,9
February	42,3
March	46,4
April	49,9
May	56,61
June	63,22
July	66,3
August	65,85
September	59,63
October	52,81
November	44,44
December	41,04

The greatest usual cold is 20°, and happens in January; the greatest usual heat is 81°, and happens generally in July.

The limits of the annual variation are 2°,5, that is, 1° above, and 1°,5 below the mean.

The greatest variations of the mean temperature of the same month in different years, are as follows:

January	6°	July	2
February	5	August	2
March	4	September	3,5
April	3	October	4
May	2,5	November	4
June	2	December	3

Hence it appears, that the temperatures of the summers differ much less than those of the winters.

The most usual variations of temperature within the space of 24 hours in every month are,

January	6°	July	10°
February	8	August	15
March	20	September	18
April	18	October	14
May	14	November	9
June	12	December	6

At Petersburgh, lat. 59°. 56′, longitude 30°. 24′ E. the mean annual temperature is 38°,8, from the mean of 6 years. The greatest cold observed was that at which mercury freezes, that is, 39° below 0°; but the greatest mean degree of cold for several years was 25° below 0°. The greatest summer heat, on a mean, is 79°, yet once it amounted to 94°. It scarce ever hails at this place.

In latitude 79°. 50′, lord Mulgrave observed the greatest heat for two days to be 58°, and the least 46°. Mr. Martin observes, that the weather in the polar regions is very unsteady: one hour it blows a violent storm, and in the next there is a dead calm; neither does it blow long in any one point, but sometimes from every point within 24 hours. After a calm, the north wind springs up first; the sky is seldom perfectly clear, and storms are much more frequent than in lower latitudes.

In Europe, unusual cold in summer may arise, either from a long continuance of easterly or northerly winds, or from frequent and heavy rains, which are followed by great evaporations, or from a long continuance of cloudy weather in June and July, which prevents the earth from receiving its proper degree of heat.

The causes of unusual cold in winter may be these: 1st, Unusual cold in the preceding summer. For the heat in the winter being in a great measure derived from the earth, if this be deprived of its usual heat, the want of it must be perceived in winter. The cold of January 1709, was the severest, long known in Europe; and Mr. Derham remarked, that the preceding June was so cold, that his thermometer was near the freezing point on the 12th of that month, and the quantity of rain was much greater than usual. Mr. Wolf made the same observation in Germany. 2dly, Heavy rains followed by easterly or northerly winds. This circumstance produces great cold at any time, on account of the great evaporation which then takes place by these dry winds. It took place in October 1708, as Mr. Wolf observed; and an intense cold immediately followed. 3dly. Westerly or southerly currents, in the upper regions of the atmosphere, while easterly or northerly winds prevail in the lower. For the warm currents are deprived of their moisture by the cold of the superior regions; and this descending in the form of snow, cools the inferior strata below their usual temperature: this circumstance also took place in 1709, when the cold was greatest. 4thly. The arrival of Siberian, or American winds. Siberia is 2800 miles east of London; but according to Mr. Smeaton's computation, a common high wind moves at the rate of 35 miles an hour, and therefore may pass to us in 3 days from Siberia, and preserve much of its original degree of cold. The winds from America may also arrive in a few days; but their rigour will be abated by passing over the sea; but if the sea have been previously cooled by northerly winds, the westerly winds may prove very cold. Mr. Derham, on comparing his journals with those of Mr. Robie in New England, found that, after a few days, the American winds passed into England. The wind in 1784 was equally severe in America, as in Europe. 5thly. The fall of a superior stratum of the atmosphere. This will happen when a cold wind in the upper regions of the atmosphere

passes over a country, the lower strata of whose atmosphere are lighter; and hence a low state of the barometer generally precedes such extraordinary cold. It is probably for this reason, that Holland oftener experiences a greater degree of cold than other countries under higher latitudes; for being a moist country, its atmosphere abounds more in vapours, which renders it specifically lighter; thus, during the great cold of January 1783, the barometer was lower than it had been known to be for 50 years before, during that month: and Muschenbrock remarked, that in winter, when the mercury in the barometer descends, the cold increases.

Land is capable of receiving much more either heat or cold, than water. In winter when the surface of water is much cooled by contact with the colder air, the deeper and warmer water at the bottom, being specifically lighter, rises and tempers the top, and as the colder water constantly descends during the winter, in the following summer the surface is generally warmer than at greater depths; whereas in winter it is colder: hence it has been remarked, that the sea is always colder in summer and warmer in winter, after a storm, the water at great depths being mixed with that at the surface. Of the following observations, the three first were made by lord Mulgrave, the three next by Wales and Bayley, and the other by Mr. Bladh. The third column expresses the heat of the air over the surface of the sea; the fourth expresses the depth of the sea in feet; the fifth expresses the heat of the sea at that depth, and the sixth expresses the heat of the sea at the surface.

Latitude.	Time.	Heat of Air.	Depth.	Heat of Sea.	Heat of Surface.
67° N.	June 20	48,5	4680	26	
78 N.	30	40,5	708	31	
69 N.	Aug. 31	59,5	4038	32	
0	Sept. 5	75,5	510	66	74
24 S.	26	72,5	480	70	70
34. 44′ S.	Oct. 11	60,5	600	57	59
57 N.	Jan. 8	46	6	40	37
	10	43,6	50	43,6	43,6
55. 40′ S.	20	47	110	51,5	40
39. 30 N.	28	53	110	59	59
2. 55 N.	Feb. 25	81	58	81	81
2. 50 N.	26	83	110	81	84,5

As the water in the high northern and southern latitudes is, by cold, rendered heavier than that in lower warm latitudes, hence arises a perpetual current from the poles to the equator, which sometimes carries down large masses of ice, which cool the air to a great extent. Inland seas of great extent have been frozen in very severe winters. In 1668, the Baltic was so firmly frozen, that Charles XI. of Sweden, carried his whole army over it: and the Adriatic was frozen in 1709. The temperatures of land and water differ more in winter than in summer; for in winter, inland countries, from lat. 49° to 70°, are frequently cooled down to 40°, 50°, and some to 70° below the freezing point; whereas, the sea below lat. 76° is not colder than 4° below that point in the northern hemisphere, except some narrow seas in the north Pacific Ocean; but in summer, no considerable extent of land is heated to more than 15° or 20° above the temperature of the sea, stony and sandy deserts excepted.

The temperatures of the smaller seas, in general, if not surrounded with high mountains, are a few degrees warmer in summer, and colder in winter, than the standard ocean; in high latitudes they are frequently frozen.

The White sea is frozen in the winter.

The Gulf of Bothnia is in a great measure frozen in winter; but in summer it is sometimes heated to 70°. Its general temperature in July is from 48° to 56°.

The German sea is about 3° colder in winter and 5° warmer in summer, than the Atlantic.

The Mediterranean sea is, for the greater part of its extent, warmer both summer and winter than the Atlantic, which, on account perhaps of its greater density, flows into it. It is sometimes frozen in the neighbourhood of Venice. The Black sea is colder than the Mediterranean, and flows into it.

The Caspian sea is situated in the vicinity of high mountains, and is in a great measure frozen in winter. Its level is said, by Pallas, to be lower than the ocean.

Some idea may be formed what latitudes on the surface of the globe are accessible to man, by considering the height above the sea of the inferior line of perpetual snow. In the middle of the torrid zone, it appears, from Mr. Bouguer's observations, to be elevated 5201 yards, and 4476 about the tropics. In middle latitudes there is constant snow at the height of 3300 yards. In lat. 80° north, lord Mulgrave found the inferior line of snow to be at the height of 400 yards: whence we may conclude, that at the poles there is constant snow upon the surface of the earth (*Pinkerton's Geography Abrid.*).

To CLI′MATE. *v. n.* To inhabit (*Shak.*).

CLI′MATURE. *s.* Climate (*Shakspeare*).

CLIMAX, or GRADATION, in rhetoric, a figure wherein the word or expression which ends the first member of a period begins the second, and so on; so that every member will make a distinct sentence, taking its rise from the next foregoing, till the argument and period be beautifully finished: as in the following gradation of Dr. Tillotson. "After we have practised good actions a while they become easy; and when they are easy, we begin to take pleasure in them; and when they please us, we do them frequently; and by frequency of acts, a thing grows into a habit; and confirmed habit is a second kind of nature; and so far as any thing is natural, so far it is necessary, and we can hardly do otherwise; nay, we do it many times when we do not think of it."

To CLIMB. *v. n.* pret. *clomb* or *climbed*; part. *clomb* or *climbed*. (climan, Saxon.) To ascend up any place; to mount by means of some hold or footing (*Samuel*).

To CLIMB. *v. a.* To ascend; to mount (*Prior*).

CLI′MBER. *s.* (from *climb.*) 1. One that mounts or scales any place; a mounter; a riser (*Carew*). 2. A plant that creeps upon other supports (*Mortimer*). 3. The name of a particular herb (*Miller*).

CLIME. *s.* (from *climate.*) Climate; region; tract of earth (*Milton. Atterbury*).

To CLINCH. *v. a.* (clýnıȝa, Saxon. 1. To hold in the hand with the fingers bent over it

(*Dryden*). 2. To contract or double the fingers (*Swift*). 3. To bend the point of a nail on the other side. 4. To confirm; to fix: as, to *clinch* an argument.

CLINCH, in the sea language, that part of a cable which is bended about the ring of the anchor, and then seized or made fast.

CLINCH. *s.* (from the verb.) A pun; an ambiguity (*Boyle. Dryden*).

CLI'NCHER. *s.* (from *clinch.*) A cramp; a holdfast (*Pope*).

CLINCHING, in the sea language, a kind of slight caulking used at sea, in a prospect of foul weather, about the posts: it consists in driving a little oakum into their seams, to prevent the water coming in at them.

To CLING. *v. n.* preter. I *clung*; particip. I have *clung*. (*klynger*, Danish.) 1. To hang upon by twining round (*Swift*). 2. To adhere, as followers or friends (*Ben Jonson*). 3. To dry up; to consume (*Shakspeare*).

CLI'NGY. *a.* (from *cling*.) Clinging; adhesive.

CLI'NICAL. CLI'NICK. *a.* (κλινω, to lie down.) That keeps the bed with infirmity. A *clinical* lecture is a discourse upon a disease, made by the bed of the patient.

CLINICS, as used by the ancient church historians, signified those who received baptism on their death-beds. Magnus, in the third century, made a doubt whether or not clinics were truly baptised, since the ordinance was, in that case, performed by aspersion, instead of immersion.

CLINIS. The name given by the Greek musicians of the middle ages to one of their notes.

To CLINK. *v. n.* To utter a small, sharp, interrupted noise (*Prior*).

CLINK. *s.* A sharp successive noise (*Sh.*).

CLINKERS, among brick-makers. See BRICK.

CLINOID, (*clinoideus*; from κλινη, a bed, and ειδος, resemblance). Resembling a bed. The four processes surrounding the cella turcica of the sphænoid bone are so called, of which two are anterior, and two posterior.

CLINOPODIUM. Wild basil, a genus of the class didynamia, order gymnospermia. Involucre of many, setaceous bristles placed under the whorl; calyx two-lipped; corol with the upper lip flat inversely heart-shaped, straight. Three species;

1. C. vulgare; found in our own hedges; with an odour between that of basil and marjoram.

2. C. Egyptiacum; a native of Egypt, an herbaceous plant like our own.

3. C. incanum; a native of North America, of similar form and odour.

CLI'NQUANT. *a.* (French.) Dressed in embroidery, in spangles (*Shakspeare*).

CLINTON, in geography, the most northern county of the state of New York, in America.

CLIO, in pagan mythology, the first of the muses, daughter of Jupiter and Mnemosyne. She presided over history. She is represented crowned with laurels, holding in one hand a trumpet, and a book in the other. Sometimes she holds a plectrum or quill with a lute. Her name signifies honour and reputation, κλεος, *gloria*; and it was her office faithfully to record the actions of brave and illustrious heroes. She had Hyacintha by Pierius, son of Magnes.

CLIO. In zoology, a genus of the class vermes, order mollusca. Body oblong, nayant, generally sheathed and furnished with two dilated membranaceous arms or wing-like processes; tentacles three, besides two in the mouth. Six species; chiefly inhabitants of the North and American seas; some round of the size of a pea, others longitudinal resembling a slug.

To CLIP. *v. a.* (clippan, Saxon.) 1. To embrace, by throwing the arms round; to enfold in the arms (*Sidney*). 2. To cut with sheers (*Suckling. Bentley*). 3. It is particularly used of those who diminish coin, by paring the edges (*Locke*). 4. To curtail; to cut short (*Addison*). 5. To confine; to hold (*Sh.*).

CLI'PPER. *s.* One that debases coin by cutting (*Addison*).

CLI'PPING. *s.* The part cut or clipped off (*Locke*).

CLITHERO, a borough in Lancashire, with a market on Saturdays, and the remains of an ancient castle. It sends two members to parliament. Lat. 53. 54 N. Lon. 2. 21 W.

CLITOMACHUS, a Carthaginian philosopher of the third academy, who was pupil and successor to Carneades at Athens, B.C. 128. For an account of this philosopher, see Brucker's History of Philosophy, by Enfield, vol. i. p. 253.

CLITORIA. In botany, a genus of the class diadelphia, order decandria. Corol reversed; the banner very large; spreading, overshadowing the wings. Six species; India, West Indies, America. They are all herbaceous annuals or perennials, of the kidney-bean tribe. The climbing stalk generally rises to the height of a man. The flowers are of various colours, though more commonly blue or white.

CLITORIS, (*clitoris*, κλειτορις; from κλειω, to enclose or hide; because it is hid by the labia pudendorum). *Columella.* A small glandiform body like a penis in miniature, and like it covered with a præpuce, or foreskin. It is situated above the nymphæ, and before the opening of the urinary passage of women. Anatomy has discovered that the clitoris is composed, like the penis, of a cavernous substance, and of a glans, which has no perforation, but is, like that of the penis, exquisitely sensible. The clitoris is the principal seat of pleasure: during coition it is distended with blood, and after the venereal orgasm it becomes flaccid and falls. Instances have occurred where the clitoris has been so enlarged, as to enable the female to have venereal commerce with others, and in Paris this fact was made a public exhibition of to the faculty. Women thus formed appear to partake, in their general form, less of the female character, and are termed hermaphro-

dites. The clitoris of children is larger in proportion than in full grown women: it often projects beyond the external labia at birth.

CLITORISMUS, (*clitorismus*). A morbid enlargement of the clitoris.

CLITORIUS, in botany. See CLITORIA.

CLITUS. The most conspicuous of this name is the familiar friend and foster-brother of Alexander. He had saved the king's life in a bloody battle. Alexander killed him with a javelin, in a fit of anger, when he was intoxicated, because, at a feast, he preferred the actions of Philip to those of his son. Alexander was inconsolable for the loss of a friend, whom he had sacrificed in the hour of drunkenness and dissipation. (*Justin. Plut. Curt.* &c.) There were others, but of less note, of this name.

CLIVE (Robert, lord), a celebrated English general. He was born at the family seat in Shropshire in 1725, and educated at several schools, and among the rest at Merchant Taylors'. In 1743 he was appointed a writer in the India company's service, and arrived at Madras the year following. In 1747 he obtained an ensign's commission in the company's service, and distinguished himself with great courage at the siege of Pondicherry. He soon rose to the rank of lieutenant; and after seeing considerable service, when hostilities ceased, he returned to his former situation as a writer. He also obtained the office of commissary to the troops. In 1753 he came to England, and was presented by the court of directors with a sword set with diamonds. He returned to India as governor of fort St. David, with the rank of lieutenant-colonel; and shortly after his arrival he assisted admiral Watson in reducing Angria the pirate. When Calcutta was taken, Clive went to Bengal and took Fort William. He defeated Surajah Dowla at the famous battle of Plassey; and the day following entered Muxadabad, where he placed Jaffier Alli Cawn on the throne. The mogul conferred on Clive the title of omrah of the empire, and he received a grant of lands worth 27,000l. a year. In 1760 he returned to England, and was made an Irish peer. In 1764 he went out again to Bengal as president, where he soon restored tranquillity, and returned home in 1767. In 1769 he was made knight of the bath. In 1773 a motion was made in the house of commons to resolve, that "in the acquisition of his wealth, lord Clive had abused the powers with which he was entrusted." He defended himself with great spirit and modesty, and the motion was not only rejected, but the house resolved, that "lord Clive had rendered great and meritorious services to his country." He represented the borough of Shrewsbury in parliament from 1760 to his death, which happened in 1774. He left 70,000l. to the invalids in the company's service. His lordship married a sister of Dr. Maskelyne, the present astronomer-royal, by whom he had five children. (*Watkins.*)

CLIVERS, in botany. See GALIUM.

CLOACA, (from κλυζω, I wash away.) Among the ancients, was a subterraneous aqueduct, or common sewer, for the reception and discharge of the filth of a city or house.

CLOACA, in comparative anatomy, the canal in birds, through which the egg descends from the ovary in its exit.

CLOACINA, a goddess at Rome, who presided over the Cloacæ, or receptacles for the filth and dung of the whole city, begun by Tarquin the elder, and finished by Tarquin the proud. There were also public officers chosen to take care of the Cloacæ, called curatores cloacarum urbis.

CLOAK. *s.* (lach, Saxon.) 1. The outer garment (*Pope*). 2. A concealment; a cover (*Peter*).

To CLOAK. *v. a.* 1. To cover with a cloak. 2. To hide; to conceal (*Spenser*).

CLO'AKBAG. *s.* A portmanteau; a bag in which clothes are carried (*Shakspeare*).

CLOCK. *s.* (*clocc*, Welsh, from *cloch*, a bell.) 1. The instrument which tells the hour by a stroke upon a bell (*Bacon*). 2. It is a usual expression to say, *What is it of the clock?* for *What hour is it?* or, *ten o'clock*, for *the tenth hour*. 3. *The clock of the stocking*; the flowers or inverted work about the ankle (*Swift*). 4. An insect; a sort of beetle.

CLOCK, a machine now constructed in such a manner, and so regulated by the uniform motion of a pendulum, as to measure time, and all its subdivisions, with great exactness. Before the invention of the pendulum, a balance, not unlike the fly of a kitchen-jack, was used instead of it. Clocks were at first called nocturnal dials, to distinguish them from sun-dials, which shewed the hour by the shadow of the sun.

The invention of clocks with wheels is ascribed to Pacificus archdeacon of Verona, in the ninth century, on the credit of an epitaph quoted by Ughelli, and borrowed by him from Panvinius. Others attribute the invention to Boethius, about the year 510.

Dr. Derham, however, makes clock-work of a much older date; ranking Archimedes's sphere, mentioned by Claudian, and that of Posidonius, mentioned by Cicero, among machines of this kind: not that either their form or use was the same with those of ours, but that they had their motion from some hidden weights or springs, with wheels or pulleys, or some such clockwork principle.

In the Disquisitiones Monasticæ of Benedictus Haëften, published in the year 1644, he says, that clocks were invented by Silvester the fourth, a monk of his order, about the year 998, as Dithmarus and Bozius have shewn; for before that time they had nothing but sun-dials and clepsydræ to shew the hour.—Conrade Gesner, in his Epitome, page 604, says, that Richard Wallingford, an English abbot of St. Albans, who flourished in the year 1326, made a wonderful clock by a most excellent art, the like of which could not be produced by all Europe.—Moreri, under the word Horologe du Palais, says, that Charles the Fifth, called the wise king of France, ordered at Paris the first large clock to be made by Henry de Vie, whom he sent for from Germany, and set it upon the tower of his palace in the year 1372.—John Froissart, in his Histoire et Chronique, vol. ii, chap. 28, says, the duke of Bourgogne had a clock

which sounded the hour, taken away from the city of Courtray in the year 1382: and the same thing is said by William Paradin in his Annals de Bourgogne.

Clock-makers were first introduced into England in 1368, when Edward the third granted a licence for three artists to come over from Delft, in Holland, and practise their occupation in this country.

The water-clocks or clepsydræ, and sun-dials, have both a much better claim to antiquity. The French annals mention one of the former kind, sent by Aaron, king of Persia, to Charlemagne, about the year 807, which it would seem bore some resemblance to the modern clocks: it was of brass, and shewed the hours by 12 little balls of the same metal, which at the end of each hour fell upon a bell, and made a sound. There were also figures of 12 cavaliers, which at the end of each hour came out through certain apertures or windows in the side of the clock, and shut them again, &c.

The invention of pendulum clocks is owing to the happy industry of the last age; and the honour of that discovery is disputed between Galileo and Huygens. The latter, who wrote an excellent volume on the subject, declares it was first put in practice in the year 1657, and the description of it printed in 1608. Becher, De Nova Temporis dimetiendi Theoria, anno 1680, contends for Galileo; and relates, though at second-hand, the whole history of the invention; adding, that one Trefler, clock-maker to the father of the then grand-duke of Tuscany, made the first pendulum clock at Florence under the direction of Galileo Galilei, a pattern of which was brought to Holland. And the Academy del Cimento says expressly, that the application of the pendulum to the movement of a clock was first proposed by Galileo, and put in practice by his son Vincenzo Galilei in 1649. But whoever may have been the inventor, it is certain that the invention never flourished till it came into the hands of Huygens, who insists on it that, if ever Galileo thought of such a thing, he never brought it to any degree of perfection. The first pendulum clock made in England was in the year 1662, by one Fromantil, a Dutchman.

After this brief sketch of the history of clocks, which may be interesting to some of our readers, we shall give a description of a modern clock according to the most approved construction. The first figure of Plate 44, is a profile of such a clock; P is a weight which is suspended by a cord that winds about the cylinder or barrel C, which is upon the axis *a a*; the pivots *b*, *b*, go into holes made in the plates TS, TS, in which they turn freely. These plates are made of brass or iron, and are connected by means of four pillars, Z, Z; the whole together being called the frame. The weight P, if not restrained, would necessarily turn the barrel C, with an uniformly accelerating motion, in the same manner as if the weight were falling freely. But the barrel is furnished with a ratchet-wheel, K, K, the right side of whose teeth strikes against the click, which is fixed with a screw to the wheel DD, as represented in fig. 2; so that the action of the weight is communicated to the wheel DD, the teeth of which act upon the teeth of the small wheel *d*, which turns upon the pivots *c*, *c*. The communication or action of one wheel with another is called the pitching; a small wheel like *d* is called a pinion, and its teeth are called leaves of the pinion. Several things are requisite to form a good pitching, the advantages of which are obvious in all machinery where teeth and pinions are employed. The teeth and pinion-leaves should be of a proper shape, and perfectly equal among themselves: the size also of the pinion should be of a just proportion to the wheel acting into it.

The wheel EE is fixed upon the axis of the pinion *d*; and the motion communicated to the wheel DD by the weight is transmitted to the pinion *d*, consequently to the wheel EE, as likewise to the pinion *e* and wheel FF, which moves the pinion *f*, upon the axis of which the crown or balance wheel GH is fixed. The pivots of the pinion *f* play in holes of the plates LM, which are fixed horizontally to the plates TS. In a word, the motion begun by the weight is transmitted from the wheel GH to the palettes IK, and by means of the fork UX rivetted on the palettes, communicates motion to the pendulum AB, which is suspended upon the hook A. The pendulum AB describes, round the point A, an arc of a circle alternately going and returning. If, then, the pendulum be once put in motion by a push of the hand, the weight of the pendulum at B will make it return upon itself, and it will continue to go alternately backward and forward till the resistance of the air upon the pendulum, and the friction at the point of suspension at A, destroys the original impressed force. But as at every vibration of the pendulum the teeth of the balance-wheel GH act so upon the palettes IK (the pivots upon the axis of these palettes play in two holes of the poteuce *s t*), that after one tooth H has communicated motion to the palette K, that tooth escapes; then the opposite tooth G acts upon the palette I, and escapes in the same manner; and thus each tooth of the wheel escapes the palettes IK, after having communicated their motion to the palettes in such a manner that the pendulum, instead of being stopped, continues to move. The wheel EE revolves in an hour; the pivot *c* of this wheel passes through the plate, and is continued to *r*; upon the pivot is a wheel NN, with a long socket fastened in the centre; upon the extremity of this socket *r*, the minute-hand is fixed. The wheel NN acts upon the wheel O; the pinion of which *p* acts upon the wheel *gg*, fixed upon a socket which turns along with the wheel N. This wheel *gg* makes its revolution in 12 hours, upon the socket of which the hour-hand is fixed.

From the above description it is easy to see, 1. That the weight P turns all the wheels, and at the same time continues the motion of the pendulum. 2. That the quickness of the motion of the wheels is determined by that of the pendulum. 3. That the wheels point out the parts of time divided by the uniform motion of the pendulum.

When the cord upon which the weight is suspended is entirely run down from off the barrel, it is wound up again by means of a key, which goes on at the square end of the arbor at Q, by turning it in a contrary direction from that in which the weight descends. For this purpose the inclined side of the teeth of the wheel K, fig. 2, removes the click C, so that the ratchet-wheel R turns while the wheel D is at rest; but as soon as the cord is wound up, the click falls in between the teeth of the wheel D, and the right side of the teeth again act upon the end of the click, which obliges the wheel D to turn along with the barrel; and the spring A keeps the click between the teeth of the ratchet-wheel R.

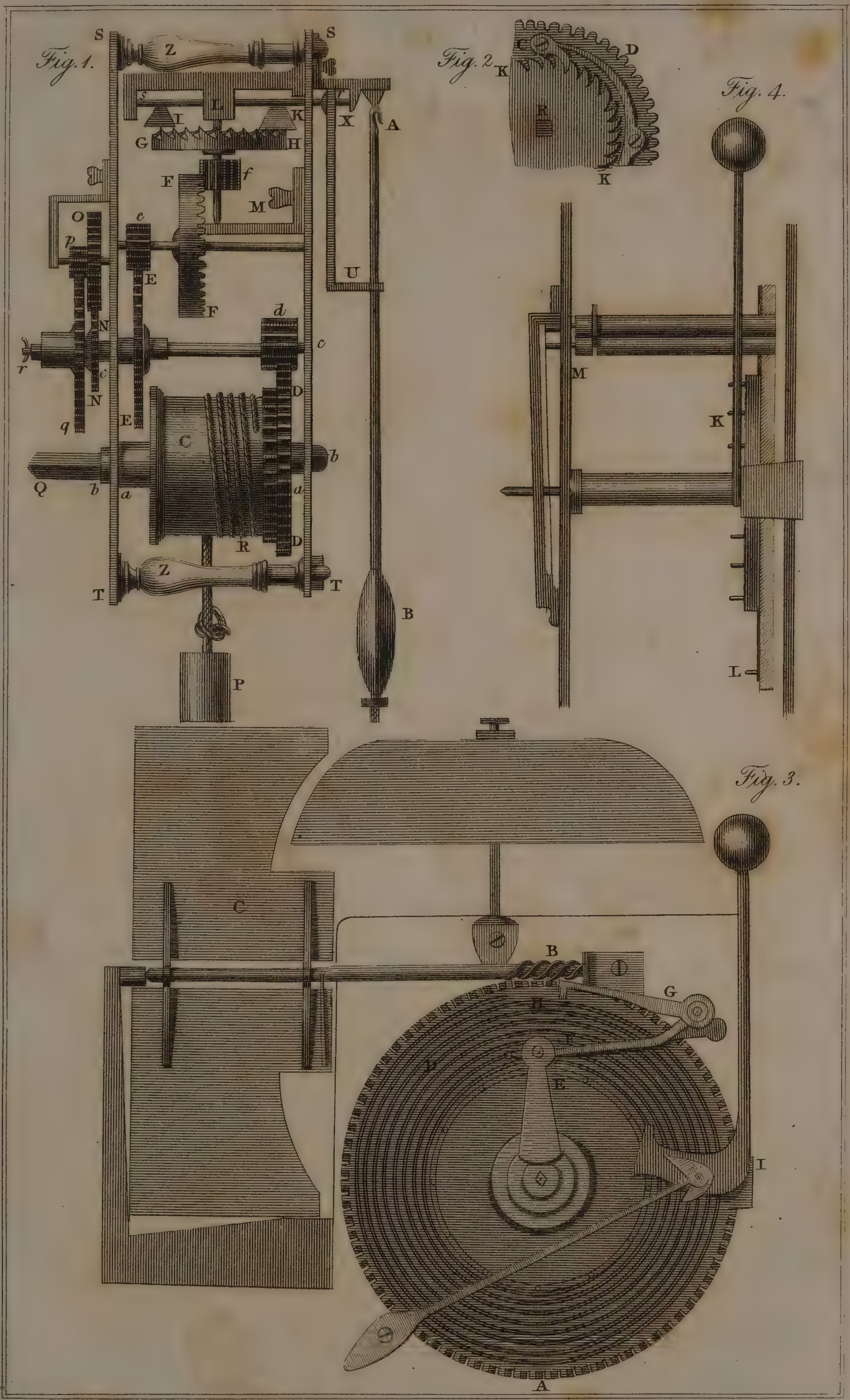
We shall now explain how time is measured by the motion of the pendulum; and how the wheel E, upon the axis of which the minute-hand is fixed, makes but one precise revolution in an hour. The vibrations of a pendulum are performed in a shorter or longer time in proportion to the length of the pendulum itself. A pendulum of $39\frac{1}{8}$ inches in length makes 3600 vibrations in an hour: i. e. each vibration is performed in a second of time, and for that reason it is called a second pendulum. But a pendulum of $9\frac{25}{32}$ inches makes 7200 vibrations in an hour, or two vibrations in a second of time, and is called a half-second pendulum. Hence, in constructing a wheel whose revolution must be performed in a given time, the time of the vibrations of the pendulum which regulates its motion must be considered. Supposing, then, that the pendulum AB makes 7200 vibrations in an hour, let us consider how the wheel E shall take up an hour in making one revolution. This entirely depends on the number of teeth in the wheels and pinions. If the balance-wheel consists of 30 teeth, it will turn once in the time that the pendulum makes 60 vibrations: for at every turn of the wheel the same tooth acts once on the palette I, and once on the palette K, which occasions two separate vibrations in the pendulum; and the wheel having 30 teeth it occasions twice 30, or 60 vibrations. Consequently this wheel must perform 120 revolutions in an hour; because 60 vibrations, which it occasions at every revolution, are contained 120 times in 7200, the number of vibrations performed by the pendulum in an hour. Now, in order to determine the number of teeth for the wheels E F, and their pinions *e f*, it must be remarked that one revolution of the wheel E must turn the pinion *e* as many times as the number of teeth in the pinion is contained in the number of teeth in the wheel. Thus, if the wheel E contains 72 teeth, and the pinion *e* 6, the pinion will make 12 revolutions in the time that the wheel makes 1; for each tooth of the wheel drives forward a tooth of the pinion, and when the 6 teeth of the pinion are moved, a complete revolution is performed; but the wheel E has by that time only advanced 6 teeth, and has still 66 to advance before its revolution be completed, which will occasion 11 more revolutions of the pinion. For the same reason the wheel F having 60 teeth, and the pinion *f* 6, the pinion will make 10 revolutions while the wheel performs 1. Now the wheel F being turned by the pinion *e* makes 12 revolutions for one of the wheel E; and the pinion *f* makes 10 revolutions for one of the wheel F; consequently the pinion *f* performs 10 times 12, or 120, revolutions in the time the wheel E performs one. But the wheel G, which is turned by the pinion *f*, occasions 60 vibrations in the pendulum each time it turns round; consequently the wheel G occasions 60 times 120, or 7200, vibrations of the pendulum while the wheel E performs one revolution; but 7200 is the number of vibrations made by the pendulum in an hour, and consequently the wheel E performs but one revolution in an hour; and so of the rest.

From this reasoning it is easy to discover how a clock may be made to go for any length of time without being wound up. 1. By increasing the number of the teeth in the wheels. 2. By diminishing the number of teeth in the pinions. 3. By increasing the length of the cord that suspends the weight. 4. By increasing the length of the pendulum. And, 5. By adding to the number of wheels and pinions. But in proportion as the time is augmented, if the weight continues the same, the force which it communicates to the last wheel GH will be diminished.

It only remains to take notice of the number of teeth in the wheels which turn the hour and minute-hands. The wheel E performs one revolution in an hour; the wheel N N, which is turned by the axis of the wheel E, must likewise make only one revolution in the same time; and the minute-hand is fixed to the socket of this wheel. The wheel N has 30 teeth, and acts upon the wheel O, which has likewise 30 teeth, and the same diameter; consequently the wheel O takes one hour to a revolution: now the wheel O carries the pinion *p*, which has 6 teeth, and which acts upon the wheel *q q* of 72 teeth; consequently the pinion *p* makes 12 revolutions while the wheel *q q* makes one, and of course the wheel *q q* takes 12 hours to one revolution; and upon the socket of this wheel the hour-hand is fixed. Much that has been said here concerning revolutions of wheels, &c. is equally applicable to watches as to clocks.

But it is time to speak of the striking part; in which, indeed, as well as the other part of a clock, there is room for great variety and choice in the construction. The wheels usually composing this part are, the great or first wheel, which is moved by the weight or spring at the barrel, in sixteen or thirty-hour clocks; this has usually pins, and is called the pin-wheel: in eight-day pieces the second wheel is commonly the pin-wheel, or striking-wheel, which is moved by the former. Next to the striking-wheel is the detent-wheel, or hoop-wheel, having a hoop almost round it, wherein is a vacancy at which the clock locks. The next is the third or fourth wheel, according to its distance from the rest, called the warning-wheel. The last is the flying pinion, with a fly or fan, to gather air, and so bridle the rapidity of the clock's motion. To these must be added the pinion of report; which drives round the locking-wheel, called also the count-wheel; ordinarily with eleven notches in it, unequally distant, to make the clock strike the hours. Besides the wheels, to the clock part belongs the rash or ratch; a kind of wheel with twelve large fangs, running concentrical to the dial-wheel, and serving to lift up the detents every hour and make the clock strike: the detents or stops, which being lifted up and let fall, lock and unlock the clock in striking; the hammer, which strikes the bell; the hammer-tails, by which the striking pins draw back the hammers; latches, whereby the work is lifted up and unlocked; and lifting-pieces, which lift up and unlock the detents.

In the year 1803 the Society for the Encouragement of Arts, &c. presented to Mr. John Prior of Nessfield, Yorkshire, a reward of 30 guineas, on account of his contrivance for the striking part of an eight-day clock. As this invention is likely to be useful, we shall describe it here. It consists of a wheel and fly, with six turns of a spiral line, cut upon the wheel for the purpose of counting the hours. The pins below this spiral elevate the hammer, and those above are for the use of the detent. This single wheel serves the purpose of count-wheel, pin-wheel, detent-wheel, and the fly-wheel, and has six revolutions in striking the 12 hours. If we suppose a train of wheels and pinions used in other striking parts to be made without error, and that the wheels and pinions would turn each



Mutlow Sc. Russell Co^t

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other without shake or play: then, allowing the above supposition to be true (though every mechanic knows it is not), Mr. Prior's striking part would be found six times superior to others, in striking the hours 1, 2, 5, 7, 10, 11; twelve times superior in striking 4, 6, 8; and eighteen times, in striking 3, 9, and 12. In striking 2, the inventor purposely made an imperfection equal to the space of three teeth of the wheel; and, in striking 3, an imperfection of nine or ten teeth; and yet both these hours are struck perfectly correct. The flies in clocks turn round, at a mean, about sixty times for every knock of the hammer, but this turns round only three times for the same purpose; and suppose the pivots were of equal diameters, the influence of oil on them would be as the number of revolutions in each. It would be better for clocks if they gave no warning at all, but the snail-piece to raise a weight somewhat similar to the model Mr. P. sent for the inspection of that respectable Society.

Reference to Mr. Prior's Striking Part of his Clock.

Plate 44, fig. 3. A, the large wheel, on the face of which are sunk or cut the six turns of a spiral.

B, the single worm screw, which acts on the above wheel, and moves the fly C.

D, the spiral work of the wheel A. The black spots shew the grooves into which the detents drop on striking the hour.

E, the groove into which the locking-piece F drops when it strikes one, and from which place it proceeds to the outward parts of the spiral in the progressive hours, being thrown out by a lifting-piece H at each hour: the upper detent G being pumped off with the locking-piece F, from the pins in the wheel A.

In striking the hour of twelve, the locking-piece, having arrived at the outer spiral at H, rises up an inclined plane, and drops by its own weight to the inner circle, in which the hour one is to be struck, and proceeds on in a progressive motion through the different hours till it comes again to twelve.

I, the hammer-work made in the common way, which is worked by thirteen pins on the face of the spiral.

Fig. 4.—K, the thirteen pins on the face of the spiral, which work the hammer-work.

L, the outer pins, which lock the detent.

M, the pump-spring to the detent.

For other information respecting clockwork, see the articles BALANCE, PENDULUM, and SCAPEMENT.

Some very simple contrivances for clocks, by Mr. Ferguson, and Dr. Franklin, may be seen in Ferguson's Select Exercises.

In the fourth century an artist named James Dondi constructed a clock for the city of Padua, which was long considered as the wonder of that period. Besides indicating the hours, it represented the motion of the sun, moon, and planets, as well as pointed out the different festivals of the year. On this account Dondi obtained the surname of Horologio, which became that of his posterity. A little time after, William Zelander constructed for the same city a clock still more complex; which was repaired in the sixteenth century by Janellus Turrianus, the mechanist of Charles V.

But the clocks of the cathedrals of Strasburgh and of Lyons are much more celebrated. That of Strasburgh was the work of Conrad Dasypodius, a mathematician of that city, who finished it about 1573. The face of the basement of this clock exhibits three dial-plates; one of which is round, and consists of several concentric circles; the two interior ones of which perform their revolutions in a year, and serve to mark the days of the year, the festivals and other circumstances of the calendar. The two lateral dial-plates are square, and serve to indicate the eclipses both of the sun and moon. Above the middle dial-plate, and in the attic space of the basement, the days of the week are represented by different divinities, supposed to preside over the planets from which their common appellations are derived. The divinity of the current day appears in a car rolling over the clouds, and at midnight retires to give place to the succeeding one. Before the basement is seen a globe, borne on the wings of a pelican, around which the sun and moon revolved; and which in that manner represented the motion of these planets: but this part of the machine, as well as several others, has been deranged for a long time. The ornamental turret, above this basement, exhibits chiefly a large dial in the form of an astrolabe; which shews the annual motion of the sun and moon through the ecliptic, the hours of the day, &c. The phases of the moon are seen also marked out on a particular dial-plate above. This work is remarkable also for a considerable assemblage of bells and figures, which perform different motions. Above the dial-plate last mentioned, for example, the four ages of man are represented by symbolical figures: one passes every quarter of an hour, and marks the quarter by striking on small bells: these figures are followed by Death, who is expelled by Jesus Christ risen from the grave; who, however, permits it to sound the hour, in order to warn man that time is on the wing. Two small angels perform movements also; one striking a bell with a sceptre, while the other turns an hour-glass at the expiration of an hour. In the last place, this work was decorated with various animals, which emitted sounds similar to their natural voices; but none of them now remains, except the cock, which crows immediately before the hour strikes, first stretching out its neck and clapping its wings. Indeed it is to be regretted that a great part of this machine is now entirely deranged.

The clock of the cathedral of Lyons is of less size than that of Strasburgh, but is not inferior to it in the variety of its movements; it has the advantage also of being in a good condition. It is the work of Lippius de Basle, and was exceedingly well repaired in the last century by an ingenious clock-maker of Lyons named Nourisson. Like that of Strasburgh, it exhibits on different dial-plates the annual and diurnal progress of the sun and moon, the days of the year, their length, and the whole calendar, civil as well as ecclesiastic. The days of the week are indicated by symbols more analogous to the place where the clock is erected: the hours are announced by the crowing of a cock, three times repeated after it has clapped its wings, and made various other movements. When the cock has done crowing, angels appear, who, by striking various bells, perform the air of a hymn; the annunciation of the Virgin is represented also by moving figures, and by the descent of a dove from the clouds; and after this mechanical exhibition the hour strikes. On one of the sides of the clock is seen an oval dial-plate, where the hours and minutes are indicated by means of an index, which

lengthens or contracts itself, according to the length of the semi-diameter of the ellipsis over which it moves.

A very curious clock, the work of Martinot, a celebrated clock-maker of the seventeenth century, was formerly to be seen in the royal apartments at Versailles. Before it struck the hour, two cocks on the corners of a small edifice crowed alternately, clapping their wings: soon after two lateral doors of the edifice opened, at which appeared two figures bearing cymbals, beat upon by a kind of guards with clubs. When these figures had retired, the centre door was thrown open, and a pedestal, supporting an equestrian statue of Louis XIV. issued from it, while a group of clouds separating, gave a passage to a figure of Fame, which came and hovered over the statue. An air was then performed by bells: after which the two figures re-entered; the two guards raised up their clubs, which they had lowered as if out of respect for the presence of the king, and the hour was then struck.

While, however, we have thought it right to describe these ingenious performances of foreign artists, we must not neglect to mention the equally ingenious workmanship of some of our own countrymen. We now refer to two clocks made by English artists, as a present from the East-India company to the emperor of China. These two clocks are in the form of chariots, in each of which a lady is placed in a fine attitude, leaning her right hand upon a part of the chariot, under which appears a clock of curious workmanship, little larger than a shilling, that strikes and repeats, and goes for eight days. Upon the lady's finger sits a bird, finely modelled, and set with diamonds and rubies, with its wings expanded in a flying posture, and actually flutters for a considerable time on touching a diamond button below it: the body of the bird, in which are contained part of the wheels that animate it as it were, is less than the sixteenth part of an inch. The lady holds in her left-hand a golden tube little thicker thon a large pin, on the top of which is a small round box, to which is fixed a circular ornament not larger than a sixpence, set with diamonds, which goes round in near three hours in a constant regular motion. Over the lady's head is a double umbrella, supported by a small fluted pillar not thicker than a quill, and under the larger of which a bell is fixed, at a considerable distance from the clock, with which it seems to have no connection; but from which a communication is secretly conveyed to a hammer, that regularly strikes the hour, and repeats the same at pleasure, by touching a diamond button fixed to the clock below. At the feet of the lady is a golden dog. (*Gregory's Mechan.*).

If instead of the barrel, on which the catgut from the weight is coiled, the fusee wheel be supposed to be substituted, and the spiral spring, and its barrel and chain to be added, a good idea will be obtained of a spring-clock.

Spring-clocks are generally used in chambers, in places where weight-moved clocks would take up too much room. They are often so constructed that their frames do not hide any part of the work, and are then inclosed with glass covers, so that all their movements may be seen; as they are designed for ornament as well as use, very elegant and expensive decorations are frequently added to them.

Spring-clocks are sometimes called portable clocks, but improperly, for no pendulum clocks can be made so as to be portable: for this purpose the balance wheel and its spring must be substituted for the pendulum, and it is this point that makes the grand distinction between clocks and watches, or chronometers; the properties of the balance spring, as a regulating power, will be found in the articles before mentioned.

Clocks for astronomical purposes, in which extraordinary nicety in the exact measurement of time is necessary, have (besides the compensation pendulums, detached escapements with jewelled pallets, and other improvements) a contrivance added to continue their movement, while the weight is winding up, which was first used in spring moved chronometers. For this purpose a second larger ratchet wheel is added on the same arbor with that which admits the clock to be wound up, but with teeth pointing the contrary way; a strong spring, usually the greatest portion of a circle, connects this large ratchet wheel with the great wheel of the clock, which is on the same axis with it: one end of this spring being attached to the great wheel, and the other end to the large ratchet; and a catch proceeds from the inner face of the back plate to the teeth of this ratchet, which prevents its moving back when the clock is winding up, and serves as a support for the reaction of the maintaining spring. When the clock is left to the operation of the weight, the small ratchet turns round the large one and contracts, or coils up the spring till it has strength sufficient to impel the great wheel and train; and when the action of the weight is suspended, as in winding up, the spring, freed from the contracting power of the weight, expands itself and forces round the great wheel; its action in the contrary direction on the great ratchet being prevented by the catch before mentioned. Le Roy is generally supposed to have invented this improvement for his chronometers; but as he has proved that the fusee is unnecessary when a detached escapement is used, the same purpose might be answered in a much simpler manner in those time-pieces which are moved by springs, by turning round the arbor to which the internal end of the main-spring is attached, in order to wind it up, instead of turning round the spring-box in the customary manner.

Though Le Roy was the first who contrived the spring impeller to prevent loss of time in winding up, Huygens was in reality the person with whom the idea originated; for he contrived a method by which the weight of his clock should continue to act on the train while it was drawing up: the weight in his clock having been made to draw up in a similar manner to that used in the common wooden clocks, instead of being wound up as in our metallic clocks. Patoureaux's clock has this contrivance. (*British Encyclop.*).

See farther the articles HOROLOGY, PENDULUM, and SCAPEMENT: and for a copious catalogue of the principal writings relative to clock and watch-making both in theory and practice, consult Gregory's Mechanics, vol. ii. pa. 140—146. See also Repertory of Arts and Manufactures, vols. 5, 6, and 7. N. S.

CLO'CKMAKER. *s.* An artificer whose profession is to make clocks (*Derham*).

CLO'CKWORK. *s.* Movements by weights or springs, like those of a clock (*Prior*).

CLOD. *s.* (cluꝺ, Saxon.) 1. A lump of earth or clay (*Ben Jonson*). 2. A turf; the

ground (*South*). 3. Any thing concreted together (*Carew*). 4. Any thing vile, base, and earthy (*Milton*). 5. A dull gross fellow; a dolt (*Dryden*).

To CLOD. *v. n.* (from the noun.) To gather into concretions; to coagulate (*Milton*).

To CLOD. *v. a.* To pelt with clods.

CLO'DDY. *a.* (from *clod*) 1. Consisting of clods; earthy; gross (*Shakspeare*). 2. Full of clods unbroken (*Mortimer*).

CLODIUS (Publius), a Roman, descended of an illustrious family. He made himself famous for his licentiousness, avarice, and ambition. He committed incest with his three sisters, and introduced himself in women's clothes into the house of J. Cæsar, whilst Pompeia, Cæsar's wife, of whom he was enamoured, was celebrating the mysteries of Ceres, or Bona Dea, where no man was permitted to appear. He was accused for this violation of human and divine laws; but he corrupted his judges, and by that mean screened himself from justice. He descended from a patrician into a plebeian family to become a tribune. He was an inveterate enemy to Cato and to Cicero; and, by his influence, he banished the latter from Rome, partly on pretence that he had punished with death, and without trial, the adherents of Catiline. He wreaked his vengeance upon Cicero's house, which he burnt, and set all his goods to sale; which, however, to his great mortification, no one offered to buy. In spite of Clodius, Cicero was recalled, and all his goods restored to him. Clodius was some time after murdered by Milo, whose defence Cicero took upon himself. (*Plut.* &c.)

CLO'DPATE. *s.* (*clod* and *pate*.) A stupid fellow; a dolt; a thickskull.

CLO'DPATED. *a.* (from *clodpate*.) Stupid; dull; doltish; thoughtless (*Arbuthnot*).

CLO'DPOLL. *s.* A thickskull; a dolt (*Sh.*).

CLOERE, anciently, a prison or dungeon.

To CLOG. *v. a.* (from *log*.) 1. To load with something that may hinder motion; to encumber with shackles (*Digby*). 2. To hinder; to obstruct (*Raleigh*). 3. To load; to burden (*Shakspeare*).

To CLOG. *v. n.* 1. To coalesce; to adhere (*Evelyn*). 2. To be encumbered or impeded by some extrinsic matter (*Sharp*).

CLOG. *s.* (from the verb.) 1. A load; a weight; any encumbrance hung to hinder motion (*Milton*). 2. A hinderance; an obstruction (*Donne*). 3. A kind of additional shoe, worn by women to keep them from wet. 4. A wooden shoe (*Harvey*).

CLO'GGINESS. *s.* The state of being clogged.

CLO'GGY. *a.* (from *clog*.) That has the power of clogging up.

CLOGHER, an episcopal town and borough of Ireland, in Tyrone. Lat. 54. 30 N. Lon. 6. 50 W.

CLO'ISTER. *s.* (clauyꞇeꞃ, Saxon; *cloistre*, French.) 1. A religious retirement (*Davies*). 2. A peristyle; a piazza.

To CLO'ISTER. *v. a.* (from the noun.) To shut up in a religious house; to confine (*Sh.*).

CLO'ISTERAL. *a.* Solitary; retired (*Walton*).

CLO'ISTERED. *part. a.* (from *cloister*.) 1. Solitary; inhabiting cloisters (*Shakspeare*). 2. Built with peristyles or piazzas (*Wotton*).

CLO'ISTRESS. *s.* (from *cloister*.) A nun (*Shakspeare*).

CLOMB. The preterit of *to climb*.

CLONIC SPASM. In a morbid state, the contractions of the muscles, or of the muscular fibres, are involuntary, and are excited by unusual and unnatural causes. When the contractions are succeeded by a relaxation, but, at the same time, are repeated without the concurrence of the will, or the repetition of natural causes, and are, at the same time, repeated more frequently, and commonly more violently, than in a healthy state—this state of morbid contraction hath been named clonic spasm, and is what we name generally a convulsion.

CLONMEL, a borough of Ireland, in the county of Tipperary. Lat. 54. 14 N. Lon. 7. 27 W.

To CLOOM. *v. a.* (clæmian, Sax.) To close or shut with viscous matter (*Mortimer*).

To CLOSE. *v. a.* (*clos*, Fr. *clausus*, Lat.) 1. To shut; to lay together (*Prior*). 2. To conclude; to finish (*Wake*). 3. To enclose; to confine (*Shakspeare*). 4. To join; to unite fractures (*Addison*).

To CLOSE. *v. n.* 1. To coalesce; to join its own parts together (*Bacon*). 2. *To* CLOSE *upon*. To agree upon (*Temple*). 3. *To* CLOSE *with*, or *in with*. To come to an agreement with; to unite with (*South*).

CLOSE. *s.* (from the verb.) 1. Any thing shut, without outlet (*Bacon*). 2. A small field enclosed (*Carew*). 3. The manner of shutting (*Chapman*). 4. The time of shutting up (*Dryden*). 5. A grapple in wrestling (*Bacon*). 6. A pause or cessation (*Dryden*). 7. A conclusion or end (*Milton*).

CLOSE, in music. See CADENCE.

CLOSE. *a.* (from the verb.) 1. Shut fast (*Wilkins*). 2. Without inlet; secret; private (*Dryden*). 3. Confined; stagnant (*Bacon*). 4. Compact; solid; dense (*Burnet*). 5. Viscous; glutinous (*Wilkins*). 6. Concise; brief; compressed (*Dryden*). 7. Joined without any intervening distance or space (*Ben Jonson*). 8. Joined one to another (*Shakspeare*). 9. Narrow; as, a *close* alley. 10. Admitting small distance (*Dryden*). 11. Undiscovered (*Sh.*). 12. Hidden; secret; not revealed (*Boyle*). 13. Having the quality of secrecy; trusty (*Shak.*). 14. Cloudy; sly (*Shakspeare*). 15. Without wandering; attentive (*Locke*). 16. Full to the point; home (*Dryden*). 17. Retired; solitary (*Chronicles*).

CLOSE. *ad.* The same with *closely* (*Mil.*).

CLOSE, in heraldry. When any bird is drawn in a coat of arms with its wings close down about it (i. e. not displayed) and in a standing posture, they blazon it by this word close; but if it be flying, they call it volant.

CLOSE HAULED, in marine language, the arrangement of a ship's sails when she endeavours to make progress in the nearest direction

possible towards that point of the compass from which the wind blows; in this manner of sailing the keel of square rigged vessels commonly makes an angle of six points with the line of the wind, but cutters, luggers, and other fore and aft rigged vessels will sail much nearer.

CLOSE QUARTERS, strong barriers of wood stretching across a merchant ship, in several places; they are used as a place of retreat when a ship is boarded by her adversary, and are therefore fitted with loop-holes, through which to fire the small arms. An English merchant ship of 16 guns, properly fitted with close quarters, has defeated the united efforts of three French privateers who boarded her.

CLO'SEBODIED. *a.* Made to fit the body exactly (*Ayliffe*).

CLO'SEHANDED. *a.* Covetous (*Arbuth.*).

CLO'SELY. *ad.* (from *close.*) 1. Without inlet or outlet (*Boyle*). 2. Without much space intervening (*Shakspeare*). 3. Attentively (*Pope*). 4. Secretly; slily (*Carew*). 5. Without deviation (*Dryden*).

CLO'SENESS. *s.* (from *close.*) 1. The state of being shut (*Bacon*). 2. Narrowness; straitness. 3. Want of air, or ventilation (*Swift*). 4. Compactness; solidity (*Bentley*). 5. Recluseness; solitude; retirement (*Shakspeare*). 6. Secrecy; privacy (*Collier*). 7. Covetousness; sly avarice (*Addison*). 8. Connection; dependance (*South*).

CLO'SER. *s.* (from *close.*) A finisher; a concluder.

CLO'SESTOOL. *s.* A chamber implement.

CLO'SET. *s.* (from *close.*) 1. A small room of privacy and retirement. 2. A private repository of curiosities (*Dryden*).

To CLOSET. *v. a* (from the noun.) 1. To shut up, or conceal, in a closet (*Herbert*). 2. To take into a closet for a secret interview (*Swift*).

CLOSET (Water), a modern invention, by means of which the grossest of animal functions may be performed in a decent and cleanly manner, and without giving offence to the feelings of others. The following is the specification of the patent granted to Mr. Binns, of Great Barlow-street, Mary-le-bone, for a machine or apparatus, answering the several purposes of a portable water-closet, a bidet, and easy chair, which together are comprised in one-third of the space or room occupied by portable water-closets now in use; and which, from its lightness and size, is particularly calculated for travelling or for camps or ships.

"The object of my invention," says Mr. Binns, "is, to remove the complaint made against a portable water-closet (heretofore invented and manufactured by me), on account of its being too bulky for frequent removals, and to increase the utility of these machines, by the addition of a bidet pan. In my former portable-closets, the back, enclosing the water-cistern, was vertically fixed upon the seat or lower part of the case; in my present invention, the back shuts down upon the seat in the manner of a lid, and thus not only reduces its size to one-third of the dimensions of the former ones, but also renders it more convenient for travelling, and less liable to be injured. This important advantage of folding down the back of the closet upon the seat I obtain by different means, viz.

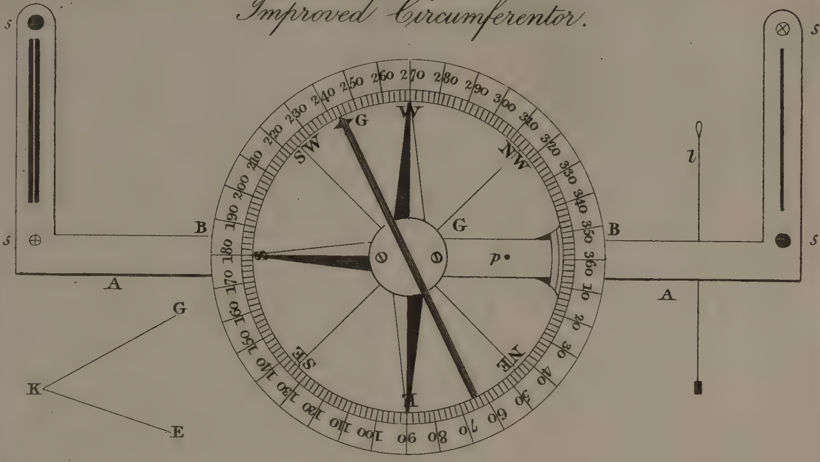
"First, By a screw-jointed tube, as particularly delineated in figs. 6 and 7 (see Plate 43). This tube consists of two angular parts, made of brass or any other proper materials: the end of one part is inserted and secured in the bottom of the water cistern, and the end of the other part is attached to the basin, in the common way of manufacture. The two parts of the tube are firmly connected, by the one screwing into the other, as may be seen in the above-mentioned figures, and serve as a joint for the back to turn upon, in being folded down upon the seat. When the back of the closet is raised the screw of the tube is perfectly close or home, the extremity of the female screw pressing against a small collar of leather which surrounds the shoulders of the male screw; but when the back is folded down upon the seat, the screw, as being the joint or hinge, relaxes a quarter turn.

"Secondly, By a jointed tube varying from the above, only in being a cock-joint instead of a screw, as described in fig. 7.

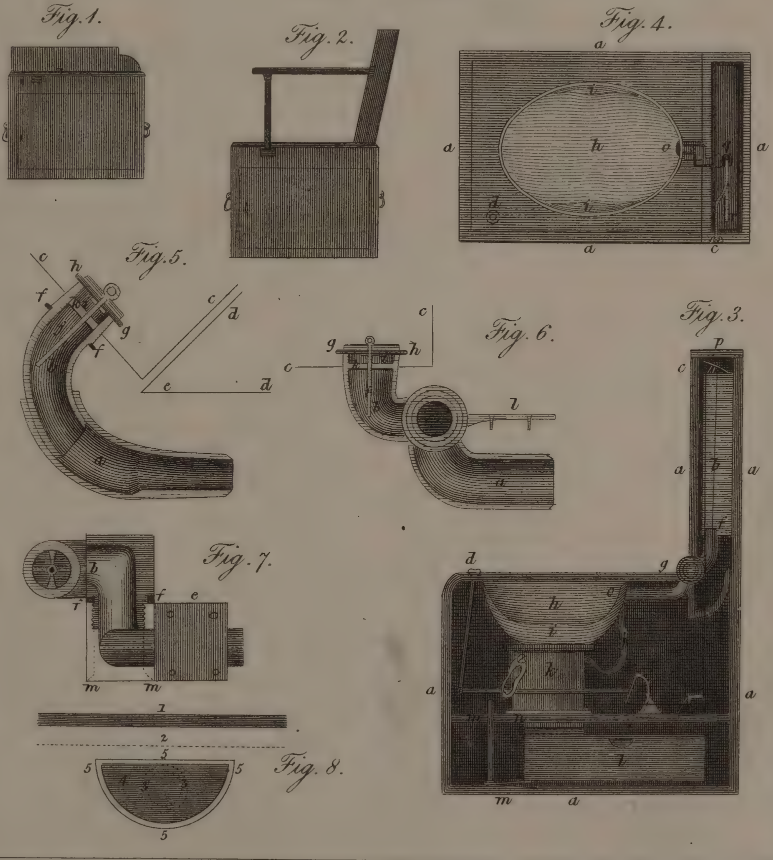
"Thirdly, By a sliding-jointed tube of two parts, each forming a curve of a quarter of a circle, as represented in fig. 5, where the back of the closet is shewn in the progress of being shut down upon the seat, to exhibit more clearly the manner in which the tube acts. The two parts of the tube are joined to the cistern and basin as the preceding ones, but not so advantageously, for this tube cannot act as a joint or hinge, and requires an accuracy in the manufacture. The above three jointed tubes are applicable to many kinds of machinery.

"Fourthly, By a leather or other flexible or jointed tube, attached to the bottom of the water-cistern and to the side of the basin. The object of my invention may also be obtained by varying and differently combining the several means herein-before described; but I prefer the first or screw-jointed tube, which includes more advantage than can be derived from any of the other methods. These tubes I generally manufacture in brass, or in what is known by the name of cock-metal. The manner in which the bidet-pan is added to the closet is so simple and obvious, as scarcely to require any other explanation than a reference to figs. 3, 4, and 8. The rim at each end of the bidet-pan rests on the front and back edge of the seat of the closet, immediately over the basin, and is supplied with water from the closet cistern, either by a separate aqueduct from the cistern, or by the same channel through which the water is admitted into the close basin; and for this purpose an aperture is made in the upper part of the back end of the bidet-pan, sufficiently large to admit the fan of the pan leading into the basin. The latter method I deem best. The pans I usually manufacture in copper, and japan them; but

Improved Circumferentor.



Water Closet.



Mutlow Sc. Russell Ct.

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they may be made of other materials, though none are, in my opinion, so well adapted to the purpose as japanned copper.

"In the figures which are annexed to elucidate this specification, I have exhibited and described the whole closet, which contains many parts that are not new, and cannot be considered as included in my present patent. The parts which I claim as my invention, and for which the patent is granted, are the folding down of the back of the closet upon the seat, or by having the back to engage and disengage, whereby the back may be laid down on the seat; or by folding or laying down the back of the closet upon the seat in any manner whatsoever: but more particularly by the different means herein-before described; the screw-jointed tube; the cock-jointed tube; the sliding tube; the tube made of leather, or any other flexible material; the application of the bidet-pan to the water-closet, and the arms or handles to make it serve as an easy chair. These arms or handles are in two parts, joined by a screw near the angle; and one part of the arm, when joined or screwed together, is attached or fixed to the seat of the closet, and the other to the back by means of sliding fastenings; by which means these arms are made to engage and disengage, for the different purposes the closet may be used for; and also for the convenience of packing in the internal part of the closet in travelling."

Explanation of the figures.—Fig. 1. A side view of the water-closet with the back shut down.

Fig. 2. A side view of the closet, with the back raised and secured by two brass arms which slide into the back and seat; for conveniency in packing, these arms separate at the angle or elbow. On this side of the bottom of the closet is shewn the door which is opened whenever the soil pan is removed.

Fig. 3. The same view on an enlarged scale. The side of the case is omitted for the purpose of exhibiting the mechanism. *a.* The frame or case containing the mechanism. *b.* The water-cistern in the back of the closet. *c.* The lever which raises the valve *f*, for the purpose of admitting water through the jointed tube into the basin or bidet-pan. This lever is raised either by drawing up the handle *d*, on the seat, or by pressing the thumb on the extremity of the lever, as appears more plainly at *c*, in fig. 4. In doing the former, not only water is admitted into the basin or bidet, but also the water in the basin is at the same time discharged into the soil-pan below, by means of the tumbler *e*, which opens a valve at the bottom of the basin; but a pressure on the lever at the top of the back produces only a single motion for discharging water out of the cistern. *g.* The screw-jointed tube more particularly described in figs. 6 and 7. *h.* The bidet-pan, which rests at each end upon the edge or the seat over the basin (see also figs. 4 and 8). *i.* The closet basin. *j.* The water-pipe. *k.* The stench-trap. *l.* The soil-pan which contains the foul water, &c. discharged by the basin. The mouth of this pan is closely attached to the pipe at the bottom of the trap, by the angular lever *m*, which is raised and secured by the brass spring catch *n.* When the pan is to be removed, a slight pressure on the knob of the catch disengages the lever, and the pan which is supported by it. In drawing out the soil-pan to discharge its contents, a lid is secured on the mouth of it to prevent the escape of any offensive effluvia in the removal. *o.* The fan at the end of the pipe or tube for admitting water into the basin and bidet-pan. *p.* The top of the back is a lid, which is opened whenever the cistern is supplied with water. The other parts of the figure are either too obvious or too well known to require explanation.

Fig. 4. A view of the seat of the closet, and of the top of the back when the lid is opened. *q.* The aperture through which the water is poured into the cistern. *r.* The spring of the lever *c.* *s.* The brass plate affixed to the lower part of the screw-jointed tube, and which is secured to the seat by four screws as a joint. The other references are explained by the same letters in fig. 3.

Fig. 5. A section of the sliding curved tube. *a.* The lower or external part of the tube, which is attached to the basin. *b.* The upper or internal part of the tube, inserted in the bottom of the cistern. *c.* These lines delineate the bottom and front side of the water-cistern. *d.* An outline of the forepart of the back, and of the seat of the closet. *e.* The joint which connects the back of the closet with the seat. *f.* A collar of leather, against which the shoulder of the upper part of the tube and the extremity of the lower one press, when the tube is closed by the back of the closet being erect. *g.* The valve in the upper or internal part of the tube, for retaining the water in the cistern. *h.* The leather lining to the valve. *i.* The screw which binds the leather to the valve. *j.* A wire to regulate the valve in its motions. In the upper part of this wire is affixed another, which communicates to the lever at the top of the water-cistern. *k.* A fixed bar in which the regulator of the valve moves.

Fig. 6. A vertical section of the screw-joined tube. *l.* A brass plate affixed to the lower part of the tube, and which is screwed down upon the seat, as appears in fig. 4. The other references are explained by those of the preceding figures.

N. B. This section is not in a direct line, but a combination of three, as shewn by the transverse dotted lines in the following figure.

Fig. 7. A horizontal section of the screw or cock-jointed tube. *m.* The vertical dotted lines point out the variation, in connecting the two parts of the tube by a cock-joint instead of a screw. The other references are explained by those in figs. 5 and 6.

In this section the upper part of the tube is more highly coloured than the lower one, for the purpose of delineating more obviously the outline of the two parts.

Fig. 8. A vertical view of the back part of the bidet-pan when fixed, as in fig. 4.

1. The upper part of the edge of the seat of the closet above the bidet-pan.

2. The rim of the end of the bidet-pan resting on the edge of the seat, which for that purpose is bevelled from the dotted line upwards.

3. The water-pipe or tube at the back of the fan.

4. The fan which disperses the water from all parts of its curvature; an improvement by which the bottom as well as the sides are completely washed.

5. The edges of the aperture in the back part of the bidet-pan, for admitting the fan. These edges of the aperture closely join to the internal surface of the basin, and thus include the whole of the fan in the bidet-pan, when it is placed upon the seat of the closet, as represented in fig. 4.

For the description of other water-closets the reader may consult the Repertory of Arts and Manufactures, vols. 7 and 11: but the above from vol. 15 seems preferable in its construction to any we have seen.

CLOSH, an old game, probably the same as nine-pins.

CLOSH. *s.* A distemper in the feet of cattle.

CLO'SURE. *s.* (from *close.*) 1. The act of shutting up (*Boyle*). 2. That by which any thing is closed or shut (*Pope*). 3. The parts enclosing; enclosure (*Shakspeare*). 4. Conclusion; end: not in use (*Shakspeare*).

CLOT. *s.* (*klotte*, Dut. a mass.) Concretion; coagulation; grume (*Bacon*).

To CLOT. *v. n.* (from the noun.) 1. To form clots; to hang together (*Philips*). 2. To concrete; to coagulate (*Philips*).

CLOTH. *s.* plural *cloths* or *clothes*. (clað, Saxon.) 1. Any thing woven for dress or covering. 2. The piece of linen spread upon a table. 3. The canvass on which pictures are delineated (*Dryden*). 4. *Clothes*. Dress; habit; garment; vesture. 5. The covering of a bed (*Prior*).

The goodness of cloth, according to some, consists in the following particulars: 1. That the wool be of a good quality, and well dressed. 2. It must be equally spun, carefully observing that the thread of the warp be finer and better twisted than that of the wool. 3. The cloth must be well wrought, and beaten on the loom, so as to be every where equally compact. 4. The wool must not be finer at one end of the piece than the rest. 5. The lists must be sufficiently strong, of the same length with the stuff, and must consist of good wool, hair or ostrich-feathers; or, what is still better, of Danish dog's hair. 6. The cloth must be free from knots and other imperfections. 7. It must be well scoured with fuller's earth, well fulled with the best white soap, and afterwards washed in clear water. 8. The hair or nap must be well drawn out with the teasel, without being too much opened. 9. It must be shorn close without making it thread-bare. 10. It must be well dried. 11. It must be tenter-stretched to force it to its just dimensions. 12. It must be pressed cold, not hot pressed, the latter being very injurious to fine woollen cloth.

Woollen cloths consist chiefly of broad cloths, kerseymeres, flannels, shalloons, serges, baizes, &c.: the two former are the most valuable, and will be chiefly noticed. The wool should be of the best quality, and in the best state of preparation before it is spun, and when the yarn is prepared it is then sent to the loom. Formerly Spanish wool bore a very high price with us, but of late years we have, by obtaining some of the sheep of that country, established a breed which is found to yield a finer sample than even the pure Marino. The justly celebrated Dr. Parry, of Bath, has sedulously attended to this point, and has produced fleeces which, in regard to fineness and length of staple, are stated to be superior, being as six to five when compared with the Spanish. Hence our woollens have latterly been less indebted to importation, and we may hope to see our flocks become doubly valuable.

The coarser kinds of cloth undergo little finishing. Linens are made of bleached flax; they are chiefly manufactured in Ireland and Scotland, both which countries derive essential advantages from their manufactures, especially as they produce the raw materials. Cotton must be imported in its raw state; a circumstance which gives employ to many thousands of our poor. Though the muslins, calicos, &c. are generally made from the thread formed by machinery. Hemp makes SAIL-CLOTH, CANVAS, &c. which see. The manufactories for woollens and linens in the united kingdoms, are supposed to give bread to near a million of persons. The importation of foreign cloths is therefore very wisely prohibited.

Manufacturing of white cloths for dying. The best wools for manufacturing cloths are those of England and Spain, especially of Lincolnshire and Segovia. In order to use them to the best advantage, they should be previously scoured, in a hot liquor consisting of three parts of pure water, and one of urine. When it has soaked a sufficient time in this liquor, to dissolve the grease, it is drained and properly washed in running water: as soon as it feels somewhat rough, and is divested of all smell, except the natural one of the sheep, it is said to be properly scoured. The wool is next exposed to dry completely in the shade; after which it is beaten with rods upon wooden hurdles, or on cords, to cleanse it from the dust and grosser filth, and prepare it for spinning, when it must be well picked, in order to separate the remaining impurities.

After this process it is oiled with oil of olives, scribbled, carded, and spun by machines. The thread is then reeled and formed into skeins: that designed for the warp is wound on small tubes, pieces of paper, or rushes so disposed that they may be easily put in the eye of the shuttle; that intended for the warp is wound on large wooden bobbins. As soon as it is warped, stiffened with size, and dried, it is mounted on the loom. The weavers, of whom there are two to each loom, tread alternately,

on the right and on the left step of the treddle, which raises and lowers the threads of the warp equally; between which latter they throw the shuttle transversely, the one to the other. Kerseymeres, however, and many other kinds of goods, have not the threads equally divided, as here described. Every time the shuttle is thrown, and a thread of the woof inserted in the warp, they strike it jointly with the same frame: to this is attached the comb, or reed, through the teeth of which the threads of the warp have been previously passed; the blow being repeated as often as is necessary. But this particular method of weaving, it should be observed, will answer only for broad cloths; as one person only is employed in weaving narrow cloths, kerseymeres, &c. And indeed since the introduction of the fly-shuttle broad cloths are woven by one person.

In this state the cloth is carried to the fullery, and scoured with urine and fuller's earth steeped in water. As soon as the cloth is again cleared from the earth and urine, it is returned to the hands for taking off knots, ends of threads, &c. by means of iron nippers, when it is delivered to the fuller, to be beaten and fulled with hot water, in which a proper quantity of soap has been dissolved. After this second fulling, it is smoothed, or pulled lengthways by the lists, in order to take out all wrinkles and unevenness. This operation is continued till the cloth is brought to a proper breadth, when it is washed in clear water, to cleanse it from the soap, and afterwards given wet to the shearmen to raise the hair, or nap, with the teasel. (*Dipsacus fullonum*, L.). The cloth-worker then takes it in hand, and performs what is called the first sheering, after which it is again delivered to the carders, who pass it repeatedly under the teasel, in proportion to the quality of the stuff. It is next returned to the cloth-worker, and from him to the carders, where the same operation is continued till the nap on the surface be properly ranged. In the north of England the workmen who perform both these operations are called croppers.

Thus prepared, the cloth is sent to the dyer, who, after having given it the proper colour, immerses it in pure water, and delivers it, while wet, to the shearman. The latter lays the nap with a brush on the table; and then suspends it on tenters, where it is sufficiently stretched, and brushed while wet, in order to bring it to its proper dimensions. As soon as it is completely dried, it is again brushed on the table, to finish the laying of the nap; after which it is folded, and laid cold under a press, to make it smooth, and to give it a gloss.

Fine goods are now generally cold-pressed; but coarse cloth hot pressed, which produces the gloss. When the cloth is taken out of the press, and the papers for glossing it are removed, the cloth is fit for immediate sale, or use.

With respect to the manufacture of mixed cloths, or those in which the wools are dyed previously to their being wrought, the process varies but little from that just described, except in what relates to the colour.

Yorkshire cloth manufactory. In Yorkshire the cloth, in its primitive state as cloth, is exhibited in halls (especially at Leeds, Huddersfield, and Halifax), for sale. We will here trace the cloth from the hall through the several operations which it undergoes before it is considered as finished. First, it is brought to the *peerk*, or perch, which is a long beam before a window, over which the cloth is drawn, the merchant standing behind it to examine whether the piece is come from the hall perfect, and free from material rents and blemishes; if not, the bargain is understood to be void, and the goods returnable. It is then delivered to the *rooers*, who, having thoroughly wetted it, rub it over a considerable time with a sort of vegetable brush, composed of the heads of a species of thistle, called the teasel (*dipsacus*, or *cardus fullonum*), and thus raise the superfluous nap to be shorn off by the croppers, or shearers. But it must first be stretched and dried upon the tenters, which are strong frames of timber, appearing at a distance like double rails, the lower ones moveable in grooves, cut in the upright posts, and capable of being fixed higher or lower by pins put through holes bored across the grooves. Both the upper and lower rails are furnished with a row of sharp-pointed nails driven in obliquely, which are called tenter-hooks, and in which the two lists or selvages of the pieces being fastened, the lower rail is forced down by levers, or, in some of a newer construction, by a wheel and pinion, till the cloth is completely stretched, and so left to dry. It is then laid upon a long table, accurately stuffed and covered, so as to admit the curved edge of a huge pair of sheers, with which the croppers, with great dexterity, pare off the superfluous nap which has been raised by the rooers. In fine cloths the operations of rooing, tentering, and cropping, are several times repeated; after which, if the cloths have been woven white, and required to be dyed of any particular colour, this is the stage for that operation. It is then burled*, that is, the lumps, &c. are picked out with small-pointed pincers, by women; and if any small holes or rents are observed they are carefully drawn; after which it is brushed by a machine composed of cylinders coated with brushes, and then goes to the press-house. Here it is carefully laid in folds, with large sheets of very smooth pasteboard between each fold; and plates of hot iron being put between each piece, the whole is strongly screwed down, and left till the plates are cold. By this operation

* Cloths in the west of England are burled before they are milled, and of course it must be done before the merchants purchase them at the hall in the north; the operation here described is called spiling. The burling irons are broad at the end; and the mode of using them is by rubbing the iron over the cloth, which is placed on a board rather inclined.

it acquires that fine gloss which is seen upon new cloth. It is then measured, and sealed wi h the firm of the house; the number of yards being marked upon the back of the leaden seal. By a very simple instrument, consisting of four iron pillars, with moveable bars, it is accurately folded; it is then wrapped in canvas, and lastly is packed in bales by the help of a strong screw-press.

It was formerly considered as one of the peculiar excellencies of the Yorkshire cloth-manufacture, that it was carried on at the respective habitations of the families employed: the several members of which went through the requisite operations, according to their respective ages, and, by the utmost industry and frugality, brought their article to market at the cheapest rate: performing, as some have asserted, the most work for the least profit of any set of manufacturers in the kingdom. Of late, this system has been much infringed by the introduction of large factories: which, however, put it in the power of the inquisitive traveller to see the various operations of cloth-making performed all together. In such large factories, the wool is picked and cleared of knots and impurities, first by the hand, and afterwards by being put into a rolling cylinder, called a willy, lined with long and sharp iron teeth. When it comes out of this machine it is carried to the scribbling-mill, which consists of a system of cylinders coated with coarse cards (the wire for forming which is now cut and bent by a machine), on the surface of which the wool being regularly transferred, at last comes out in one uniformly continued and coherent layer. In this state it is carried to the carding engine, which is only a like machine composed of finer cards, except that to the last cylinder of cards a fluted wooden cylinder is adapted, which scrapes off the wool in thin rolls, fit for being carried to the stubbing-machine by little children, whose business is to feed the various spindles of which it consists, and which, being turned by a wheel and bands, spin it into coarse threads; another machine, on the same construction, called a jenny, spins out these threads still finer, so as to be ready for weaving: in this operation there is nothing peculiar in Yorkshire.

Method of weaving cloth of an extremely fine quality, by Mr. Nevin, of Woolwich. Trans. Soc. Arts, vol. 24.—The chief impediment to weaving cloth of a fineness beyond what is usual has arisen from the reed, which could not be formed of sufficient strength if its parts were reduced in thickness beyond a certain degree; and as in the usual method of weaving, only a single thread was admitted between each division of the reed, the extent of the reed of course limited the fineness of the cloth which could be woven. Mr. Nevin's method of obviating this difficulty is so extremely simple and obvious, that it seems strange it has not been thought of before. It consists in merely putting two, three, four, or more threads of the warp between each division or split of the reed, instead of a single one; this method, however, is so effectual, that Mr. Nevin has woven by it a plain silk web, from hard thrown silk in the gum, that contains the surprising quantity of 65,536 meshes or crossings, in one square inch; a vastly greater number than in the finest cloth known before.

When the cloth is woven and taken out of the loom it has the appearance of being barred or striped, the cane of the reed causing the part it struck to look thinner; but upon being wet, and in that state repeatedly worked and stretched backwards, forwards, and corner ways by the hands, it soon loses this appearance, the interstices in the struck part closing up like other parts of the web. This last operation must in cotton fabrics be performed before they go to the bleach ground.

Samples of cloth, woven in this manner, may be seen at the house of the Society of Arts, &c. who voted Mr. Nevin a premium of fifteen guineas for this discovery.

See farther the articles Loom, Weaving, &c.

And as this is a most important subject, which the limits assigned us compel us to treat with brevity, we would beg to refer the reader for more information to Petty's History of Cloth-making; Paulet, Art de fabriquer les étoffes de soie; Duhamel, Art du drapier; La Platière, Art du fabriquant des étoffes en laine; La Platière, Art du fabriquant de velours de coton; Duncan's Essays on the art of Weaving; Improvements in Weaving, in Bailey's Machines; and various improvements secured by patent described in Repertory of Arts, &c. vols. 9, 12, and 15, old series, and vol. 1, new series.

For the laws relating to the woollen manufactory, see stat. 3 and 4 Edw. III. cap. 2. 3 and 4 Edw. IV. cap. 6. 17 Edw. IV. cap. 6. 5 and 6 Edw. VI. cap. 6. 4 and 5 Ph. and M. cap. 5. 29 Eliz. cap. 20. 1 Jac. I. cap. 8. 7 Jac. I. cap. 7. 21 Jac. I. cap. 18. 12 Car. II. cap. 22. 1 Anne. 7 Anne, cap. 13, 10 Anne, cap. 16. 1 Geo. I. cap. 15. 11 Geo. I. 12 Geo. I. 13 Geo. I. 11 Geo. II. 14 Geo. II. 5 Geo. III. cap. 51. 6 Geo. III. cap. 23. 12 Geo. III. cap. 34.

Cloth (Incombustible). See Asbestos.

To CLOTHE. *v. a.* pret. and particip. *clothed* or *clad.* (from *cloth.*) 1. To invest with garments; to cover with dress, from cold and injuries (*Addison*). 2. To adorn with dress (*Ray*). 3. To invest, as with clothes (*Dryden*). 4. To furnish or provide with clothes.

To Clothe. *v. n.* To wear clothes (*Shakspeare*).

CLO'THIER. *s.* (from *cloth.*) A maker of cloth (*Graunt*).

CLO'THING. *s.* (from *to clothe.*) Dress; vesture; garments (*Swift*).

CLOTHSHE'ARER. *s.* One who trims the cloth, and levels the nap (*Hakewill*).

CLOTHO, the youngest of the three Parcæ, daughters of Jupiter and Themis. She was supposed to preside over the moment of man's

birth. She held the distaff in her hand, and spun the thread of life, whence her name κλωθω "to spin." She was represented wearing a crown with seven stars, and covered with a variegated robe.

CLOTPOLL. *s.* (from *clot* and *poll.*) 1. Thickskull; blockhead (*Shakspeare*). 2. Head, in scorn (*Shakspeare*).

To CLOTTER. *v. n.* (*klotteren*, Dutch.) To concrete; to coagulate (*Dryden*).

CLOTTY. *a.* (from *clot.*) Full of clots; concreted; full of concretions (*Mortimer*).

CLOUD. *s.* (derivation not known.) 1. A dark collection of vapours in the air 2. A vein or stain, in stones or other bodies. 3. Any state of obscurity or darkness (*Waller*). 4. Any thing that spreads wide (*Atterbury*).

CLOUD, a visible aggregate of minute drops of water, suspended in the atmosphere. It is concluded, from numerous observations, that the particles of which a cloud consists are always more or less electrified. The hypothesis, which assumes the existence of vesicular vapour, and makes the particles of clouds to be hollow spheres, which unite and descend in rain when ruptured, however sanctioned by the authority of several eminent philosophers, does not seem necessary to the science of meteorology in its present state; it being evident that the buoyancy of the particles is not more perfect than it ought to be, if we regard them as mere drops of water. In fact they always descend, and the water is elevated again only by being converted into invisible vapour.

Vapour is formed and diffused in all directions from its source with a force proportioned to the temperature of the water, and subject to the opposing force of the vapour already in the air.

The vapour thus emitted may be decomposed in different ways; as, 1. Immediately on its passing into the atmosphere, producing a fog or mist. 2. After having mounted through the warm air, near the earth, on its arrival in a higher and colder region, in which case dense clouds are there formed. 3. After having been uniformly mixed with the mass of the atmosphere, and perhaps travelled with it to a great distance from its source; in this case it either falls in dew, or is collected into sheets or horizontal beds during a slower subsidence; or lastly, it becomes a conductor to the electricity, if the equilibrium of the latter is disturbed; and indicates by its arrangement in threads the usual effects of that fluid on light bodies.

In every case, the caloric which constituted the vapour decomposed, appears to pass into the atmosphere, which hence becomes often sensibly warmer just before rain; and on the other hand, the evaporation of the water suspended in the air, robs it of so much as to become sensible to our feelings in its comparative coldness.

The predisposing causes of these changes near the earth are probably to be found in the state of the superior currents, which undoubtedly both impart and carry off great quantities of vapour; but this part of the subject is at present imperfectly provided with such observations as might serve for data to our reasoning.

There are three simple and distinct modifications, in any one of which the aggregate of minute drops, called a cloud, may be formed, increase to its greatest extent, and finally decrease and disappear.

By modification is to be understood simply the structure or manner of aggregation, not the precise form or magnitude, which indeed varies every moment in most clouds. The principal modifications are commonly as distinguishable from each other as a tree from a hill, or the latter from a lake; although clouds in the same modification, considered with respect to each other, have often only the common resemblances which exist among trees, hills, or lakes, taken generally.

The same aggregate, which has been formed in one modification, upon a change in the attendant circumstances may pass into another.

Or it may continue a considerable time in an intermediate state, partaking of the characters of two modifications; and it may also disappear in this stage, or return to the first modification. Lastly, aggregates, separately formed in different modifications, may unite and pass into one, exhibiting different characters in different parts; or a portion of a simple aggregate may pass into another modification, without separating from the remainder of the mass. Hence, together with the simple, it becomes necessary to admit intermediate and compound modifications, and to impose names on such of them as are worthy of notice.

The simple modifications are thus named and defined:

1. Cirrus. Def. Nubes cirrata, tenuissima, quæ undique crescat.

Parallel, flexuous, or diverging fibres, extensible in any or in all directions.

2. Cumulus. Def. Nubes cumulata, densa, sursum crescens.

Convex or conical heaps, increasing upward from a horizontal base.

3. Stratus. Def. Nubes strata, aquæ modo expansa, deorsum crescens.

A widely extended, continuous, horizontal sheet, increasing from below.

The intermediate modifications which require to be noticed are:

4. Cirro-cumulus. Def. Nubeculæ densiores, subrotundæ, et quasi in agmine appositæ.

Small, well defined, roundish masses, in close horizontal arrangement.

5. Cirro-stratus. Def. Nubes extenuata, subconcava vel undulata. Nubeculæ hujusmodi appositæ.

Horizontal or slightly inclined masses, attenuated towards a part or the whole of their circumference, concave downward; or undulated, separate, or in groups, consisting of small clouds, having these characters.

The compound modifications are:

6. Cumulo-stratus. Def. Nubes densa, basim cumuli cum structura patente exhibens.

A dense cloud with the base of the cumulus, but in its upper part extended into a broad flat structure.

7. Cumulo-cirro-stratus, vel nimbus. Def. Nubes vel nubium congeries pluviam effundens.

The rain cloud. A cloud, or system of clouds, from which rain is falling. It is a horizontal sheet, above which the cirrus spreads, while the cumulus enters it laterally, and from beneath. For plates, and a detailed account in illustration of these definitions, see Mr. Howard's paper on the modification of clouds, and on the principles of their production, suspension, and destruction, in Tilloch's Philosophical Magazine, vol. xvi.

The height of the clouds is not usually great: the summits of high mountains being commonly quite free from them, as many travellers have experienced in passing these mountains. It is found that the most highly electrified clouds descend lowest, their height being often not more than 7 or 800 yards above the ground; and sometimes thunder-clouds appear actually to touch the ground with one of their edges: but the generality of clouds are suspended at the height of a mile, or little more, above the earth.

The motions of the clouds, though often directed by the wind, are not always so, especially when thunder is about to ensue. In this case they are seen to move very slowly, or even to appear quite stationary for some time. The reason of this probably is, that they are impelled by two opposite streams of air nearly of equal strength; and in such cases it seems that both the aërial currents ascend to a considerable height; for Messrs. Charles and Robert, when endeavouring to avoid a thunder cloud, in one of their aërial voyages with a balloon, could find no alteration in the course of the current, though they ascended to the height of 4000 feet above the earth. In some cases the motions of the clouds evidently depend on their electricity, independent of any current of air whatever.

The uses of the clouds are evident, as from them proceeds the rain that refreshes the earth, and without which, according to the present state of nature, the whole surface of the earth must become a mere desert. They are likewise useful as a screen interposed between the earth and the scorching rays of the sun, which are often so powerful as to destroy the grass and other tender vegetables. In the more secret operations of nature too, where the electric fluid is concerned, the clouds bear a principal share; and chiefly serve as a medium for conveying that fluid from the atmosphere into the earth, and from the earth into the atmosphere: in doing which, when electrified to a great degree, they sometimes produce very terrible effects.

To Cloud. *v. a.* (from the noun.) 1. To darken with clouds; to obscure. 2. To make of gloomy appearance (*Pope*). 3. To obscure; to make less evident (*Decay of Piety*). 4. To variegate with dark veins (*Pope*).

To Cloud. *v. n* To grow cloudy; to grow dark with clouds.

CLO'UDBERRY. *s.* A plant; knotberry. See Rubus.

CLO'UDCAPT. *a.* Topped with clouds (*Shakspeare*).

CLOUDCOMPE'LLING. *a.* An epithet of Jupiter, by whom clouds were supposed to be collected (*Waller*).

CLO'UDILY. *ad.* (from *cloudy.*) 1. With clouds; darkly. 2. Obscurely; not perspicuously (*Spenser*).

CLO'UDINESS. *s.* (from *cloudy.*) 1. The state of being covered with clouds; darkness (*Harvey*). 2. Want of brightness (*Boyle*).

CLO'UDLESS. *a.* (from *cloud.*) Clear; unclouded; bright; luminous (*Pope*).

CLOUDS (Magellanic.) See Magellanic clouds.

CLO'UDY. *a.* (from *cloud.*) 1. Obscured with clouds (*Exodus*). 2. Dark; obscure; not intelligible (*Watts*). 3. Gloomy of look; not cheerful (*Spenser*). 4. Marked with spots or veins. 5. Not bright; wanting lustre (*Boyle*).

CLOVE. The preterit of *cleave.*

Clove. *s.* (*clou*, French, a nail, from the similitude of a clove to a nail.) 1. A valuable spice, brought from Ternate, the fruit or seed of a large tree (*Brown*). 2. One of the parts into which garlick separates.

Clove, a term used in the weights of wool. Seven pounds make a clove. In Essex, eight pounds of cheese and butter go to the clove.

Clove, July-flower. See Dianthus.

Clove-tree, in botany. See Caryophyllus and Eugenia.

CLO'VEN. part. pret. from *cleave.*

Clo'ven-footed, Clo'ven-hoofed, *a.* (*cloven* and *foot*, or *hoof.*) Having the foot divided into two parts; bisulcous.

CLOVER. *s.* (clæfer, Saxon.) 1. A species of trefoil. (See Trifolium and Husbandry.) 2. *To live in* Clover, is to live luxuriously.

CLO'VERED. *a.* (from *clover.*) Covered with clover (*Thomson*).

CLOUGH. *s.* (clough, Saxon.) A cliff.

Clough. *s.* (in commerce.) An allowance of two pounds in every hundred weight for the turn of the scale, that the commodity may hold out weight when sold by retail.

CLOUT. *s.* (clout, Saxon.) 1. A cloth for any mean use (*Swift*). 2. A patch on a shoe or coat. 3. Anciently, the mark of white cloth at which archers shot (*Shakspeare*). 4. An iron plate to an axle-tree.

To Clout. *v. a.* (from the noun.) 1. To patch; to mend coarsely (*Milton*). 2. To cover with cloth (*Spenser*). 3. To join awkwardly together (*Ascham*).

CLOU'TED. *particip. a.* Congealed; coagulated: for *clotted* (*Gay*).

Clouted cream, in rural economy, such cream as is raised by means of the milk being heated.

CLO'UTERLY. *a.* Clumsy; awkward (*Mortimer*).

CLOWN. *s.* (lown, Saxon.) 1. A rustick; a churl (*Sidney*). 2. A coarse ill-bred man (*Swift*).

CLO'WNERY. *s.* (from *clown.*) Ill-breeding; churlishness; rudeness (*L'Estrange*).

CLO'WNISH. *a.* (from *clown.*) 1. Consisting of rusticks or clowns (*Dryden*). 2. Coarse; rough; rugged (*Spenser*). 3. Uncivil; ill-bred (*Shakspeare*). 4. Clumsy; ungainly (*Prior*).

CLO'WNISHLY. *ad.* Coarsely; rudely.

CLO'WNISHNESS. *s.* (from *clownish.*) 1. Rusticity; coarseness (*Locke*). 2. Incivility; brutality.

CLOWN'S ALL-HEAL. In botany. See STACHYS.

CLOWN'S WOUNDWORT. See STACHYS.

To CLOY. *v. a.* (*enclouer*, Fr. to nail up.) 1. To satiate; to sate; to surfeit (*Sidney*). 2. To strike the beak together (*Shakspeare*). 3. To nail up guns, by striking a spike into the touch-hole.

CLO'YLESS. *a.* (from *cloy.*) That cannot cause satiety (*Shakspeare*).

CLO'YMENT. *s.* (from *cloy.*) Satiety; repletion; beyond appetite (*Shakspeare*).

CLOYNE, an episcopal town and borough of Ireland, in the county of Cork. Lat 51. 54 N. Lon. 8. 0 W.

CLUB. *s.* (*clwppa*, Welsh.) 1. A heavy stick (*Spenser*). 2. The name of one of the suits of cards. 3. The shot or dividend to be paid (*L'Estrange*). 4. An assembly of good fellows (*Dryden*). 5. Contribution; joint charge (*Hudibras*).

To CLUB. *v. n.* (from the noun.) 1. To contribute to a common expence. 2. To join to one effect (*King*).

To CLUB. *v. a.* To pay to a common reckoning (*Pope*).

CLUBHE'ADED. *a.* (*club* and *head.*) Having a thick head (*Derham*).

CLUBLA'W. *a.* (*club* and *law.*) The law of arms (*Addison*).

CLUBRO'OM. *s.* (*club* and *room.*) The room in which a club or company assembles (*Addison*).

CLUB-MOSS. In botany. See LYCOPODIUM.

CLUB-TOP. In botany. See CLAVARIA.

CLUB-SHAPED. (Clavatus.) In botany. See CLAVATE.

To CLUCK. *v. n.* (cloccan, Saxon.) To call chickens, as a hen (*Ray*).

CLUE. See CLEW.

CLUMP. *s.* (*klumpe*, Teut.) An ill-shaped thick piece of wood, nearly as broad as long.

CLUMP, also denotes a rather irregular, though close group of trees.

CLUMPS. *s.* A numbskull (*Skinner*).

CLU'MSILY. *ad.* (from *clumsy.*) Awkwardly.

CLU'MSINESS. *s.* (from *clumsy.*) Awkwardness; ungainliness; want of dexterity (*Collier*).

CLU'MSY. *a.* (*lompsch*, Dutch, stupid.) Awkward; heavy; artless; unhandy (*Dryden*).

CLUNCH, the name given by miners, well-diggers, &c. to a variety of stony matters they meet with in digging. Much of this is found below the sand stratum in Leighton, Woburn, Ampthill, and other parts of Bedfordshire.

CLUNG. The preterit and participle of *cling.*

CLUNG. *a.* (clunzu, Saxon.) Wasted with leanness; shrunk up with cold.

CLUNY, a town of France, in the department of Saone and Loire. It is noted for its late famous Benedictine abbey. Lat. 46. 24 N. Long. 4. 33 E.

CLU'PEA. Herring. In zoology, a genus of the class pisces, order abdominalia. Head compressed, rough within; jaws unequal, the upper with serrate mystaces; tongue short, rough, with unequal teeth; eyes moderate, round, marginal; gills setaceous; the covers three or four leaved; the membrane eight rayed; body compressed, elongated, covered with moderate scales; lateral line straight, near to, and parallel with the back; belly carinate, and generally serrate; ventral fins often nine rayed; tail forked. Fifteen species; scattered through the different seas of the globe, but chiefly found in the North seas.

1. C. harengus. British herring. Body without spots; lower jaw longer. Inhabits the Northern seas, and migrates southerly in immense shoals towards the coast for the purpose of spawning, and during its journey is followed by numerous predatory fishes, as well as birds. In a commercial view it is a fish of very high consequence, yielding not only immense quantities of food, but, in the Northern seas, large quantities of oil. On this account we shall extract from Mr. Pennant a more detailed statement of its annual migratory course towards our own country, at the same time abridging his description as much as we are able.

The great winter rendezvous of the herring is within the arctic circle: here it recruits itself after the labour of spawning, and here also it finds far more insect food than in our warmer latitudes. The mighty army begins to put itself in motion in the spring; in fact the word herring means, says Mr. P., an army, being derived from the German *heer.* Yet of this we have some doubt, and would rather trace it from the German and Dutch *her*, lord or master, in consequence of the high exultation evinced in Holland upon the commencement of the herring season, which clearly imports (as, in reality, every one knows to be a fact) that the herring is in that country regarded as the prince or utmost prize of fishes. The host of herrings begin to appear off the Shetland isles in April and May: these however are only the forerunners of the grand shoal that arrives in June: the first is attended by large bodies of ganets and other birds which accompany to prey on them, but when the main body approaches its breadth and depth is such as to alter the very appearance of the ocean. This body is divided into distinct columns of five or six miles in length and three or four in breadth,

and the water is driven with a rippling current before them: sometimes they appear so near the surface as to reflect, in bright weather, a variety of splendid colours like a field of the most precious gems, in which, or rather in a much more valuable light, this stupendous gift of Providence should be regarded by the British isles. The first check this army meets in its march southward, is from the Shetland isles, by which it is divided into two parts; one wing takes to the east, the other to the west of Great Britain, and fill every bay and creek with their numbers: others pass on towards Yarmouth, the great and ancient mart of herrings; they then pass through the British channel, and after that gradually disappear, being scattered in different courses towards the Hebrides, north of Ireland and Atlantic. These brigades, however, are often capricious in their secondary movements, and do not show an invariable attachment to the same courses after their grand separation. Some herrings, nevertheless, are found on the coasts of Europe at all seasons; and hence M. Bloch and several other naturalists doubt whether they migrate so far as to the arctic circle, and incline to believe that they only disappear, because in the colder seasons they plunge to a greater depth in the sea.

One of the chief enemies of the herring is the whale; some of which have been found to have in their stomachs not less than six hundred at a time. The herring itself is said to feed on sea insects and the smaller kind of marine worms. See HERRING FISHERY.

2. C. pilcardus. Pilchard. Nose turned up; dorsal in the centre of gravity; scales firm. Appears periodically in vast shoals on the Cornish coast, about July; body thicker and rounder than the herring; less; the back more elevated, and the belly not so sharp nor so serrate; is more full of oil. On the fifth of October, 1767, there were at one time included in St. Ives's bay, as the result of the shootings of the single season, seven thousand hogsheads of this species, each hogshead containing thirty-five thousand fishes; the whole amounting to twenty-four millions.

3. C. sprattus. Sprat. Dorsal fin seventeen-rayed; belly strongly serrate. Inhabits the Northern seas, and migrates like the herring in large shoals; from four to five inches long; body silvery, back blueish; scales large and easily deciduous; flesh very good, but oily.

4. C. alosa. Shad. Sides with round black spots placed longitudinally; snout bifid. Inhabits the Mediterranean, North European, American, and Asiatic seas; from two to three feet long: ascends rivers in May and June to spawn; feeds on worms and insects, and is the prey of larger fishes. Back dusky-blue, or greenish-yellow; scales large, deciduous; flesh sometimes eaten, though not very good. See Plate XLVII.

5. C. encrasicolus. Anchovy. Upper jaw longer; back green, semi-pellucid; sides of the belly silvery and opake; belly not serrate; is gutted, beheaded, and potted for a relish. Inhabits the European, Mediterranean, and Atlantic seas; six and half inches long; approaches the shores from December to March, for the purpose of spawning. See Plate XLVII.

6. C. atherinoides. Lateral line silvery; lower jaw shorter. Inhabits Surinam. By some regarded as an atherine; but on account of its compressed body and small ventral fins more properly placed here.

7. C. thrissa. Anal fin with twenty-eight rays; last ray of the dorsal long, setaceous. Inhabits America, India, and China: in spawning time frequents the shores; about a foot long, feeds on testaceous animals and the spawn of other fishes. Flesh very savory, but often poisonous.

8. C. cyprinoides. Belly obtuse. Inhabits between the tropics; body oblong, hardly a foot long, silvery, above greenish-blue; scales smooth, a little striate and convex.

9. C. setirostris. Lateral bones of the upper jaw setaceous; anal fin with thirty-two rays. Inhabits the Pacific and Red seas.

10. C. mystus. Body ensiform; anal fin joined to the tail. Inhabits the Indian sea.

11. C. tropica. Tail wedged. Inhabits Ascension Island.

12. C. sinensis. Outmost ray of the gill-membrane truncate behind. Inhabits China: resembles the herring, but broader.

13. C. haumela. Body lanceolate, naked; ventral, anal, and caudal fins none; dorsal reaching the whole length of the back; tail linear. Inhabits the Red sea: about a yard long.

14. C. dorab. Ventral fins minute; upper-lip two horned with extended teeth; lower longer; teeth strong, erect. Inhabits the Red sea.

15. C. villosa. Lateral line prominent, rough. Inhabits the Northern seas.

CLU'SIA. Balsam-tree. In botany, a genus of the class polygamia, order monoecia. Male: calyx from four to six-leaved; the leaves opposite and imbricate; corol from four to six-petalled; stamens numerous. Female: nectary formed of the united anthers inclosing the germ; capsule five-celled, five-seeded, filled with pulp. Six species; natives of the West Indies, New Caledonia and Tongataboo. The species chiefly worth noticing is

C. flava. A native of Jamaica, and other West Indian islands. The tree reaches the height of about twenty feet, with branches shot forth in every direction, furnished with thick, round, veinless, succulent leaves, and terminal, four-petalled flowers, succeeded by an oval fruit. From every part of the tree exudes a resinous gum called by the natives hog-gum, because they affirm that hogs, when wounded, resort to the trees and smear the wound over with it by rubbing it against the trunk of the tree. The plants in our own country are very tender, and require a good deal of warmth.

CLU'STER. *s.* (clyꞅteꞃ, Saxon.) 1. A bunch; a number of things of the same kind growing or joined together (*Bacon*). 2. A number of animals gathered together (*Milt.*). 3. A body of people collected (*Addison*).

To CLU'STER. *v. n.* To grow in bunches (*Dryden*).

To CLU'STER. *v. a.* To collect any thing into bodies.

CLU'STERED or CROWDED. (*confertus.*) In botany. See CROWDED.

CLU'STERY. *a.* Growing in clusters.

To CLUTCH. *v. a.* 1. To hold in the hand; to gripe (*Herbert*). 2. To comprise; to grasp (*Collier*). 3. To contract; to double the hand (*Shakspeare*).

CLUTCH. *s.* (from the verb.) 1. The gripe; grasp; seizure. 2. The paws; the talons (*L'Estrange*). 3. Hands (*Stillingfleet*).

CLUTIA. See CLUYTIA.

CLUTIA ELUTERIA. Cascarilla clutia. The systematic name of the tree which affords the cascarilla bark. See CASCARILLA.

CLU'TTER. *s.* (See CLATTER.) A noise; a bustle; a busy tumult (*King*).

To CLU'TTER. *v. n.* (from the noun.) To make a noise or bustle.

CLUVERIUS (Philip), an eminent geographer. He was born at Dantzic in 1580, and educated at Leyden, where he died in 1623. He published several books, the most known of which are, 1. De tribus Rheni alveis. 2. Germania antiqua. 3. Sicilia antiqua. 4. Italia antiqua. 5. Introductio in universam Geographiam.

CLUYTIA. In botany, a genus of the class diœcia, order gynandria. Calyx five-leaved; petals five. Male: stamens five on the middle of the style. Fem.: styles three, capsules three-celled, seeds solitary. Ten species: natives of the Cape and India. Of these the only species we can here notice is

C. eleuteria, with heart-lanceolate leaves, a native of India, which is now satisfactorily ascertained to afford the cascarilla bark of the dispensatories, which has hitherto been ascribed to another genus. These plants may be easily propagated by cuttings; but require care, and a constant stove-heat.

CLYDE, a river of Scotland, which rises in Annandale, and running N.W. through Clydesdale, passes by Lanerk, Hamilton, and Glasgow, falling into the frith of Clyde, a few miles below Glasgow. Near Lanerk, this river runs for several miles between high rocks covered with wood; and in its course exhibits many astonishing cataracts. At Stonebyres, it is confined within a very narrow bed, and makes one entire shoot, falling about 60 feet over a perpendicular rock; the water then pouring over another precipice, is dashed into a deep chasm beneath. At Corehouse the waterfall is greater still: here the water is precipitated at least 100 feet beneath two rugged precipices.

CLYPEOLA. Treacle-mustard. In botany, a genus of the class tetradynamia; order siliculosa. Silicle emarginate, orbicular, computed flat, deciduous, divisible into two parts, one-celled, one-seeded. One species only; though more have been suspected to belong to this genus: c. jonthlaspi, a native of Spain and Italy; a hairy herbaceous plant; with leaves spatulate, sessile, glaucous; flowers yellow; stamens with each a tooth above the base. It bears removal into this country and propagation with moderate care.

CLYSMUS. A clyster. See ENEMA.

CLYSMA (*clysma*; κλυσμα, from κλυζω, to wash out.) Clyster.

CLYSSUS, in chemistry, an obsolete word of uncertain meaning; some authors using it to denote a mixture of extracts, or an extract from several bodies mingled together; while Macquer applies it to the vapours which arise during the detonation of nitre by any inflammable substance, and which vapours, he says, may be collected and condensed into a liquor, of which, in his Dictionary, he points out the properties.

CLY'STER. *s.* (χλυςηρ.) An injection into the anus. See ENEMA.

CLYTEMNESTRA, in fabulous history, a daughter of Tyndarus king of Sparta, by Leda, was born, together with Castor, from one of the eggs which her mother brought forth after her amour with Jupiter, under the form of a swan. Clytemnestra married Agamemnon king of Argos. When Agamemnon went to the Trojan war, he left his cousin Ægysthus to take care of his wife, and domestic affairs. In the absence of Agamemnon, Ægysthus made his court to Clytemnestra, and publicly lived with her. Agamemnon heard of her infidelity, and he resolved to take full revenge upon the adulterers at his return. He was prevented from putting his schemes into execution; Clytemnestra, with her adulterer, murdered him at his arrival. Cassandra, whom Agamemnon had brought from Troy, shared his fate, and Orestes would also have been deprived of life, like his father, had not his sister Electra removed him from the reach of Clytemnestra. After this murder, Clytemnestra publicly married Ægysthus, who ascended the throne of Argos. Orestes, who, after an absence of seven years, returned to Mycenæ, resolved to avenge his father's murder. He concealed himself in the house of his sister Electra. His death was publicly announced; and when Ægysthus and Clytemnestra repaired to the temple of Apollo, to return thanks to the god, for the death of the surviving son of Agamemnon, Orestes, with his faithful friend Pylades, hid himself in the temple, rushed upon the adulterers, and killed them with his own hand. Vid. ÆGYSTHUS, AGAMEMNON, ORESTES, ELECTRA. (*Diod. Homer*, &c.)

CLYTIA or CLYTIE, in fabulous history, a daughter of Oceanus and Tethys, beloved by Apollo. She was deserted by her lover, who paid his addresses to Leucothoe; and this so irritated her, that she discovered the whole intrigue to her rival's father. Apollo despised her the more for this, and she pined away and was changed into a flower, commonly called a sunflower, which still turns its head towards the sun in his course, as in pledge of her love.

CNEORUM. See CONVULVULUS and DAPHNE.

CNEPH, in mythology, denoting good, by

way of eminence, an appellation, under which the ancient Egyptians, particularly in the vicinity of Thebes, honoured the beneficence of the Creator; as they adored his power under the name of Phtha, and his wisdom under that of Neith.

CNESTIS. In botany, a genus of the class decandria, order pentagynia. Calyx five-parted; petals five; capsules five, two-valved, one-seeded. Four species: Madagascar; Sierra Leone. Herbaceous plants from a foot and half to two feet high; one or two of which have acute horned, downy, stinging capsules.

CNICUS. Blessed thistle. A genus of the class syngynesia, order polygamia æqualis. Calyx imbricate, swelling with spinous scales; down feathery; receptacle villous. Fifty-four species; chiefly of the Levant and south of France. Three or four species indigenous to our own country; of all which known the only one worth noticing is the c. benedictus, or carduus benedictus of the dispensatories: for the medical virtues of which, see CARDUUS BENEDICTUS. It is an annual plant, cultivated in our gardens: flowers in June and July, and matures its seeds about the end of August. For medical purposes it should be gathered while in flower, dried in the shade, and afterwards kept in an airy place to prevent its becoming mouldy, to which it has a strong tendency.

CNIDUS and GNIDUS, a town and promontory of Doris in Caria. Venus was the chief deity of the place, and had there a famous statue made by Praxiteles (*Horat.*).

CNOSUS, a town of Crete, about 25 stadia from the sea. It was built by Minos, and had a famous labyrinth.

CO, Coos, and Cos, one of the Cyclades, situâte near the coasts of Asia, about 15 miles from Halicarnassus. It gave birth to Hippocrates and Apelles, and was famous for its fertility, and the wine and silk worms which it produced (*Ovid*).—The women of Cos were changed into cows by Venus or Juno; whom they reproached for suffering Hercules to lead Geryon's flocks through their territories (*Tibull.* &c.).

To COACE'RVATE. *v. a.* (*coacervo*, Lat.) To heap up together (*Bacon*).

COACERVA'TION. *s.* (from *coacervate.*) The act of heaping together (*Bacon*).

COACH, a vehicle for commodious travelling suspended on springs, and moved on four wheels. In Britain, and throughout Europe, the coaches are drawn by horses, except in Spain, where they use mules. In a part of the east, especially the dominions of the great Mogul, their coaches are drawn by oxen. In Denmark they sometimes yoke rein-deer in their coaches; though rather for curiosity than use. The coachman is ordinarily placed on a seat raised before the body of the coach; but in Spain it is otherwise, the coachman being placed like our postilion, on the first horse on the left.

A coach is a very modern invention, if by that word be meant a covered carriage suspended on springs. We learn, indeed, from the laborious researches of professor Beckmann, that coaches of some kind were known in the beginning of the 16th century; but they were used only by women of the first rank; for the men thought it disgraceful to ride in them. At that period, when the electors and princes did not choose to be present at the meetings of the states, they excused themselves by informing the emperor that their health would not permit them to ride on horseback; and it was considered as a point established, that it was unbecoming for them to ride like women. It is certain, however, that, about the end of the 15th century, the emperor, kings, and princes, began to employ covered carriages on journeys, and afterwards on public solemnities.

The wedding carriage of the first wife of the emperor Leopold, who was a Spanish princess, cost, together with the harness, 38,000 florins. The coaches used by that emperor are thus described by Kink: "In the imperial coaches no great magnificence was to be seen; they were covered over with red cloth and black nails. The harness was black, and in the whole work there was no gold. The pannels were of glass, and on this account they were called the imperial glass coaches. On festivals the harness was ornamented with red silk fringes. The imperial coaches were distinguished only by their having leather traces; but the ladies in the imperial suite were obliged to be contented with carriages, the traces of which were made of ropes." At the magnificent court of duke Ernest Augustus of Hanover, there were, in the year 1681, fifty gilt coaches with six horses each. So early did Hanover begin to surpass other cities in the number of its carriages. The first time that ambassadors appeared in coaches on a public solemnity was at the imperial commission held at Erfurth in 1613, respecting the affair of Juliers.

In the history of France we find many proofs that at Paris, in the 14th, 15th, and even 16th centuries, the French monarchs rode commonly on horses, the servants of the court on mules, and the princesses, together with the principal ladies, sometimes on asses. Persons of the first rank often sat behind their equerry, and the horse was often led by servants. Carriages, however, of some kind appear to have been used very early in France. An ordinance of Philip the Fair, issued in 1294 for suppressing luxury, and in which the citizens wives are forbid to use carriages (cars), is still preserved. Under Francis I. or rather about 1550, somewhat later, there were in Paris for the first time only three coaches.

The oldest carriages used by the ladies in England, were known under the now forgotten name of whirlicotes. When Richard II. towards the end of the 14th century, was obliged to fly before his rebellious subjects, he and all his followers were on horseback; his mother only, who was indisposed, rode in a carriage. This, however, became afterwards somewhat unfashionable, when that monarch's queen, Ann, the daughter of the emperor Charles IV. shewed the English ladies how gracefully and

conveniently she could ride on a side-saddle. Whirlicotes were laid aside, therefore, except at coronations and other public solemnities. Coaches were first known in England about the year 1580, and, as Stow says, were introduced from Germany by Fitzallen, earl of Arundel. In the year 1598, when the English ambassador went to Scotland, he had a coach with him. Anderson places the period when coaches began to be in common use about the year 1605. The celebrated duke of Buckingham, the unworthy favourite of two kings, was the first person who rode with a coach and six horses, in 1619. To ridicule this new pomp, the earl of Northumberland put eight horses to his carriage.

Respecting the progress of luxury with regard to coaches, the reader will find much curious information in the first volume of professor Beckmann's History of Inventions.

Coaches (Hackney), those exposed to hire, in the streets of London, and some other great cities, at rates fixed by authority. Twelve hundred hackney-coaches are allowed in London and Westminster; which are licensed by commissioners, and pay a duty to the crown. They are all numbered, having their numbers marked on tin plates fixed on the coach-doors. Their fares or rates are settled by act of parliament.

The penalties under the act for regulating hackney-coaches, are recoverable at the hackney-coach-office, Somerset-place, Strand, where the commissioners administer the most impartial justice between the hirer and the hired. Hackney coaches first began to ply in the city of London in 1625, when they were only 20 in number.

Coaches (Stage), are those appointed for the conveyance of travellers from one city or town to another. The masters of stage-coaches are not liable to an action for things lost by their coachmen, who have money given them to carry the goods, unless where such master takes a price for the same. These also pay an annual duty to the revenue.

Coaches (Mail), are a sort of stage-coaches calculated for expeditiously carrying the mails, which are protected by a guard, and subject to the regulations of the post-office. They are exact as to their time of arrival and departure, are restricted to four inside passengers, and from experience have proved very beneficial to the commerce and correspondence of this country.

The number of coaches made in England in the year 1793, was at least 40,000; of which more than half were exported. Indeed the London coachmakers exceed all others in the splendour, beauty, and ease, which they give to these vehicles. Several of their ingenious inventions have been secured by patents, the specifications of which may be seen in the different volumes of the Repertory of Arts.

Coach, in sea language, denotes a chamber or apartment near the stern, in a ship of war.

To Coach. *v. a.* (from the noun.) To carry in a coach (*Pope*).

Coach-box. *s.* The seat on which the driver of the coach sits (*Arbuthnot*).

Coach-hire. *s.* Money paid for the use of a hired coach (*Spectator*).

Coach-house. *s.* The house in which the coach is kept from the weather (*Swift*).

CO'ACHMAKER. *s.* The artificer whose trade is to make coaches (*Swift*).

CO'ACHMAN. *s.* The driver of a coach.

To CO'ACT. *v. n.* (from *con* and *act.*) To act together; to act in concert (*Shakspeare*).

COA'CTION. *s.* (*coactus*, Latin.) Compulsion; force (*South*).

COA'CTIVE. a (from *coact.*) 1. Having the force of restraining or impelling; compulsory; restrictive (*Raleigh*). 2. Acting in concurrence: obsolete (*Shakspeare*).

COADJU'MENT. *s.* Mutual assistance.

COADJU'TANT. *a.* (*con* and *ajuto*, Lat.) Helping; operating (*Philips*).

COADJU'TOR. *s.* 1. A fellow-helper; an assistant; an associate (*Garth*). 2. (In the canon law.) One who is appointed to perform the duties of another (*Ayliffe*).

COADJU'VANCY. *s.* Help; concurrent help; contribution of help (*Brown*).

COADUNATE LEAVES. In botany, several joined together, or united at the base.

COADUNATÆ, the fifty-second of Linnéus's natural orders.

COADUNI'TION. *s.* The conjunction of different substances into one mass (*Hale*).

To COAGME'NT. *v. a.* (from *con* and *agmen*, Latin.) To congregate (*Glanville*).

COAGMENTA'TION. *s.* (from *coagment.*) Coacervation into one mass (*Ben Jonson*).

COA'GULABLE. *a.* (from *coagulate.*) That which causes coagulation (*Arbuthnot*)

Coagulable lymph. Albumen. Albumina. Albuminous principle of the serum of blood. This substance, which has a great affinity to the white of eggs, is a component part of the serum of the human blood. It may be obtained in considerable quantities, by stirring the serum about with a stick, when it adheres to its sides. In certain diseased actions it is separated from the blood, and is often found in very considerable quantities in the circumscribed cavities of the body. It has neither taste nor smell; it always possesses a white and opake colour; is of a glutinous consistence, and, if dried by a gentle heat, becomes horny. Its presence is detected by an admixture of the diluted mineral acids. See also Albumen.

Coagulating lymph. It is by this name Mr. John Hunter, and consequently the students in his school, denominate the fluid antecedently called Coagulable lymph, which see. It is by them regarded as the most important part of the blood, whether viewed as a nutriment, or as possessed of retractive powers in case of wounds and morbid affections in general.

To COA'GULATE. *v. a.* (*coagulo*, Latin.) To force into concretions (*Bacon*).

To Coa'gulate. *v. n.* To run into concretions, or congelations (*Boyle*).

COA'GULATION, a term which was formerly used synonymously with crystallation, is now employed to denote the act of rendering a fluid body in some degree solid by exposure to cold, or by the addition of some agent by which it is decomposed. Thus, the white of eggs, the serum of the blood, &c. are coagulated by the addition of alcohol; milk, by mixture with acids; blood, by exposure to heat, &c. The term is, however, sometimes applied to a sudden, confused, and copious production of crystals so minute and irregular as not to appear to the eye in a crystalline form; thus, when strong sulphuric acid is poured into a concentrated alkaline solution, the whole is converted into a confused mass, apparently not crystallised, of sulphat of potash. With the nature of coagulation, and of the change it produces, chemists are as yet but little acquainted.

COA'GULATIVE. *a.* (from *coagulate.*) That has the power of causing concretion (*Bo.*).

COAGULA'TOR. *s.* from *coagulate.*) That which causes coagulation (*Arbuthnot*).

COA'GULUM, is generally applied to the substance which results from coagulation; by some it is especially used to denote rennet; and by others the curdled concretions or precipitates formed by the mixture of two liquors.

COAL. *s.* (col, Saxon; *kol*, German; *kole*, Dutch.) 1. The common fossil fewel (*Denham*). 5. The cinder of burnt wood; charcoal (*Bacon*). 3. Any thing inflamed or ignited (*Dryden*).

To COAL. *v. a.* (from the noun.) 1. To burn wood to charcoal (*Carew*). 2. To delineate with coal (*Camden*).

COAL, in mineralogy, a most important genus of mineral inflammables, in which is included the carbonaceous and carbono-bituminous fossils: for the technical description of the different kinds of which, see BITUMEN.

We here add, from the Philosophical Magazine, Mr. David Mushet's general table of the analyses of different kinds of pit-coal.

	Volatile Matter.	Carbon.	Ashes.	Specific Gravity of the Coal.	Specific Gravity of the Coke.
Welsh furnace coal	8·5	88·068	3·432	1·337	1·
Alfreton furnace coal.	45·5	52·456	2·044	1·235	less than water
Butterly furnace coal.	42·830	52·882	4·288	1·264	1·100
Welsh stone coal	8·	89·700	2·300	1·368	1·3934
Welsh slaty ditto	9·100	84·175	6·725	1·409	
Derbyshire cannel ditto.	47·000	48·362	4·638	1·278	
Kilkenny coal.	4·250	92·877	2·873	1·602	1·6568
Stone coal found under basalt	16·660	69·740	13·600		
Kilkenny slaty coal	13·000	80·475	6·525	1·445	
Scotch cannel coal.	56·570	39·430	4·000		
Boolavooneen ditto } Irish	13·800	82·960	3·240	1·436	1·596
Corgee ditto } Irish	9·100	87·491	3·409	1·403	1·6560
Queen's county, No. 39 } Irish	10·300	86·560	3·140	1·403	1·6218
Stone wood, Giants' Causeway.	33·370	54·697	11·933	1·150	
Oak wood	80·000	19·500	·500		

Coal, of all the substances which naturalists have arranged in the class of inflammables, is by far the most serviceable to mankind. Nature has dealt it to us with an unsparing hand, and has provided mines of this mineral which seem to defy the power of man to exhaust. England and France, where the different branches of manufacture are carried to a greater extent and perfection than in the other countries of Europe, are, at the same time, the most abundantly provided with mines of coal, as if nature were most disposed to second the exertions of an industrious people by giving them the best possible assistance. Coal is always found in masses, sometimes in a heap, most frequently in beds; but rarely in veins. The beds are disposed within the earth with different degrees of inclination, and in almost every possible direction. These beds of coal are supposed by most naturalists to be a deposit formed by the waters of the ocean, which once covered our continent. They are never found single, but generally disposed in strata one above another. The beds of coal are separated by layers of stone, which are nearly of the same nature in all coal-mines. Those which form the side and the top of a stratum of coal are a sort of friable slate, containing more or less of bitumen, while the bottom is generally more compacted and mixed with micaceous sand. It is remarkable that this slaty kind of stone, which so generally accompanies the coal, should frequently contain the impressions of plants, and particularly ferns, some of which are met with in the finest state of preservation.

The most remarkable coalery that we have ever had in this island, was that wrought at Borrowstounness, under the sea. The veins of coal were found to continue under the bed of the sea in this place, and the colliers had the courage to work the vein near half way over; there being a mote half a mile from the shore, where there was an entry that went down into the coal-pit, under the sea. This was made

into a kind of round key or mote, as they call it, built so as to keep out the sea, which flowed there twelve feet. Here the coals were laid, and a ship, of that draught of water, could lay her side to the mote, and take in the coal. This famous colliery belonged to the earl of Kincardine's family. The fresh water which sprung from the bottom and sides of the coal-pit, was always drawn out upon the shore by an engine moved by water, that drew it forty fathom. This coal-pit continued to be wrought many years to the great profit of the owners, and the wonder of all that saw it; but, at last an unexpected high tide drowned the whole at once: and the labourers had not time to escape, but perished in it.

There are several other countries in Europe which possess considerable coal-mines; as France, Liege, Germany, and Sweden. Also on the other side of the Atlantic ocean there has been coal discovered, and wrought; in Newfoundland, Cape-Breton, Canada, and some of the New-England provinces. But in all these countries, the coal is of a quality much inferior to the British, and entirely unfit to be used in many manufactures; so that they are obliged to import great quantities from Britain for the use of their manufactures of iron, &c.

In Scotland, the mines of Carron, of Edinburgh, and of Glasgow, are chiefly distinguished for their produce. There are three beds of coal at Carron, the first of which is about 40 fathoms below the surface, the second 50, and the third 55. Only two beds are worked at Edinburgh, and one of them is remarkable for its situation, the opening of the mine being hardly forty fathoms from the sea, and only three fathoms above high water mark. The mines of Glasgow stretch from the north-east to the south-west, and occupy a considerable space of ground. Here are several beds of coal, placed on each other and continued nearly from the surface of the ground to the depth of three hundred feet; but of these beds there are only two or three that are worth the trouble of working.

The principal mines of this useful mineral in England are those of Newcastle and Whitehaven. The town of Newcastle absolutely stands on beds of coals, which extend to a considerable distance round the place. There are seven or eight beds of this mineral, one above the other, and all inclined in a south-east direction; the lowest is a hundred fathoms from the surface of the earth. But the mines near Whitehaven will afford the best idea of these wonderful places. We learn that these coal mines are perhaps the most extraordinary of any in the known world. The principal entrance for men and horses is by an opening at the bottom of a hill, through a long passage hewn in the rock, which, by a steep descent, leads down to the lowest vein of coal. The greatest part of this descent is through spacious galleries, which continually intersect each other; all the coal being cut away, except large pillars, which, in deep parts of the mine, are three yards high, and twelve square at the base. The mines are sunk to the depth of a hundred and thirty fathoms, and are extended under the sea to places where, above them, the water is of sufficient depth for ships of large burthen. These are the deepest coal mines that have hitherto been wrought, and perhaps the miners have not in any other part of the globe penetrated to so great a depth below the surface of the sea; the very deep mines in Hungary, Peru, and elsewhere, being situated in mountainous countries, where the surface of the earth is elevated to a great height above the level of the ocean. There are here three strata of coal, which lie at a considerable distance, one above another; the communication between each is preserved by pits. The vein is not always regularly continued in the same inclined plane, but is sometimes interrupted by hard rocks, and in those places the earth seems to have sunk downwards from the surface, while the part adjoining hath retained its ancient situation. These breaks the miners call dykes, and when they meet with one of them, they first observe whether the direction of the strata is higher or lower than in the part where they have been working. If, to employ their own terms, it is cast down, they sink a pit to it with little trouble; but should it, on the contrary, be cast up to any considerable height, they are frequently obliged to carry a long level through the rock with much expense and difficulty, till they again arrive at the vein of coal.

In these deep and extensive works, the greatest care is requisite to keep them continually ventilated with perpetual currents of fresh air, to expel the damps and other noxious exhalations, and supply the miners with a sufficiency of that vital fluid. In the deserted works, large quantities of these damps are frequently collected, and often remain for a long time without doing any mischief: but when, by some accident, they are set on fire, they produce dreadful and destructive explosions, and burst out of the pits with great impetuosity, like the fiery eruptions from burning mountains. The coal in these mines has several times been set on fire by the fulminating damp, and continued burning many months until large streams of water were conducted into the mines, and suffered to fill those parts where the coal was on fire. Several collieries have been entirely destroyed by such fires: of these there are instances near Newcastle, and in other parts of England, and in the shire of Fife in Scotland; in some of which places the fire has continued burning for ages. To prevent as much as possible the collieries from being filled with these pernicious damps, it has been found necessary to search for those crevices in the coal whence they issue, and then confine them within a narrow space, from which they are afterwards conducted through long tubes into the open air, where, being set on fire, they consume in perpetual flames, as they continually arise out of the earth. The late Mr. Spedding, who was the great engineer of those works, having observed

that the fulminating damp could only be kindled by flame, and was not liable to be set on fire by red hot iron, nor by the sparks, produced by the collision of flint and steel, invented a machine, in which, while a steel wheel is turned round with a very rapid motion, flints are applied to it, and by the abundance of fiery sparks emitted, the miners are enabled to carry on their work in places where the flame of a lamp or candle would occasion dreadful explosions. Without some invention of this sort, the working of these mines would long ago have been impracticable, so greatly are they annoyed by these inflammable damps. Fewer mines, however, have been ruined by fire than by inundations; and here that noble piece of mechanism the steam-engine displays its beneficial effects. When the four engines belonging to this colliery are all at work, they discharge 1228 gallons of water every minute at thirteen strokes; and, after the same rate, 1,768,320 gallons every twenty-four hours.

The road from the Whitehaven coal-mines to the water side is mostly on a gentle descent, and provided with an iron railway: this, by removing much of the friction, exceedingly facilitates the carriage of the coals to the shipping, which are laid alongside of the quay to receive them. When the waggons are loaded, they run without any assistance on the railway till they arrive at the quay, where the bottom striking out, the waggon discharges its contents into a large flue, or, as the workmen term it, a hurry, through which it rattles into the hold of the vessel with a noise like thunder. A man is placed in each waggon to guide it, who checks its progress, if necessary, by pressing down one of the wheels with a piece of wood provided for the purpose. When the waggons are unloaded, they are carried round by a turn-frame, and drawn back to the pits by a single horse along another road. The coal trade is supposed to maintain nearly 15,000 mariners, and to employ about 2000 coal-heavers, who are allowed a fixed sum on clearing each ship, according to her tonnage. These are supposed to be the hardest working men in the kingdom: they often earn six, seven, or eight shillings in the day; of which at least one-third, or perhaps one-half, is spent in porter.

There are different opinions among geologists respecting the origin of coal. Some suppose this combustible substance to be produced by the decomposition of the soft parts of the immense quantity of organized bodies of which we find almost every where the solid remains. But unfortunately this conjecture, which appears so natural, is liable to several strong objections. One is the presence of vegetables scarcely decomposed, which are often met with in the middle of beds of coal. The others, the want of direct experiments to prove that organized bodies give out bitumen during their decomposition. Without stopping to discuss these points, we shall merely give the general conclusions of naturalists, as they are mentioned by Brogniart. 1. That coal was formed, either at the same time, or after the existence of organized bodies. 2. That this mineral when first formed was liquid, and of a great degree of purity. 3. That the cause which produces this deposit is several times renewed in the same place, and nearly under the same circumstances. 4. That the cause, whatever it may be, is nearly the same all over the earth, since the beds of coal always exhibit nearly the same phenomena in their structure and accidental circumstances. 5. That these beds have not been deposited by any violent revolution; but, on the contrary, in the most tranquil manner; since the organized bodies that are found in them are often entire, and the leaves of vegetables impressed in the slate which covers the coals are hardly ever bruised, or otherwise deranged. (*British Encyclo.*).

For the art of searching for and discovering coal, in any district of country where it has not yet been found, we must refer to the article COALERY, in the English Encyclopædia, and the article COAL, in Dr. Rees's New Cyclopædia.

It is a circumstance worthy of notice, that not less than 70 kinds of coal are brought to the London market; the value and prices of which differ, in general, from 1s. to 10s. and sometimes even 15s. in the chaldron, according to their qualities. About 45 of these various sorts are imported from Newcastle, and the remainder from Sunderland; the whole of which may be divided into four classes:

The first class contains only six kinds of coal; called Wall's-end, Bigg's-main, Walker's, Heaton-main, Willington, and Hebburn-main. The prices of these sorts vary, according to their abundance in the market, from 1s. to 3s. per chaldron; but they are generally upon a par, except the Wall's end, which is mostly 6d. or 1s. dearer than the others.

The second class includes three sorts; all of which run large. They light and burn like a candle, and produce white ashes. These are usually mixed either with some of the first class, or with any of the strong sorts of the second, third, and fourth classes; because they run large, and make them burn in a more lively manner. These three sorts are, Hartley, Coupen-main, and Blythe; and their price is generally from 2s. to 4s. more or less, below that of Wall's-end, according to their scarcity or abundance in the market. Next to these are twelve sorts, which possess nearly the same qualities as the best coals, but are in general smaller, and seldom vary more than 2s. in the chaldron, though they are usually from 3s. to 4s. in price under the Wall's-end.

The third class consists nearly of the same number as the second, and is likewise divided into two sorts: the first of which burns quickly, and produces white ashes; the other is very strong and good, but, at the same time, very small, and is used by smiths, and manufacturers. The prices of this class of coals are generally from 4s. to 6s. per chaldron, more or less, under that of the Wall's-end, according to their abundance or scarcity.

Lastly, the fourth class contains all the re-

maining kinds of coal: they differ also in quality; some burn light, produce white ashes, are slaty, and very indifferent; others are small and strong, but not good enough for smiths. The price of these varies greatly, especially of the lighter kind. It is, in general, from 8s. to 10s. and even 15s. lower than the Wall's-end. These different classes, and particularly some of the inferior sorts, are frequently mixed together, and thus afford an opportunity of changing the prices of coals; this, however, is always to the loss of the consumer, who loses 10s. or more in the quality, in the hope of saving 4s. or 6s. in the price.

The following is a striking instance of the great variation to be found in the quality of coal: in weighing different kinds of that fossil, there was the surprising difference of 30lbs. in the weight of two sacks, which were equally filled.

All the coals brought to London market are publicly sold, only by the whole, half, or quarter ship. Those who have neither craft nor wharfs to unload, at the rate of 40 chaldrons per day, purchase from some of the greatest coal-merchants: this is called loading on account; and the former pay 1s. per chaldron for commission.

Pool-measure is one-fourth of a chaldron extra, on any five chaldrons; and a room of coals $5\frac{1}{4}$ chaldrons, contains about 68 sacks of three bushels each, or somewhat less; but this quantity may be divided into from 70 to 90 sacks, if they are filled up, and not measured by the bushel, under the inspection of a sworn meter. The pool measure, therefore, being larger than the bushel measure, the profit of a coal-merchant may be estimated, upon an average, at five sacks upon five chaldrons, that is, at about 8 per cent.

Use of Coals as Manure.—The first experiments for ascertaining the effect of pounded coals, or their ashes, on the fertility of meadows and corn-fields, we believe, were made in Germany, by counsellor Stumpf, about the year 1791. On account of the vitriolic acid contained in coals, they are, for this purpose, superior to gypsum, especially on cold, calcareous soils. According to his directions, the coal-dust, or powder, ought to be scattered on the fields, late in autumn, about the thickness of the back of an ordinary knife, so that he employed about four cwt. of coal to manure a German acre of 180 square roods, Rhenish measure. But, as there is a great difference between those coals, the residue of which, after burning, consists of calcareous earth, or stone, and others, which leave an aluminous slate; he advises the agriculturist to make use of the former kind for every species of clover and grasses, as well as for wheat, rye, barley, oats, or similar grain; and to avail himself of the latter in the culture of spelt, buck-wheat, as likewise of clover, and the different species of grain, but particularly of all the leguminous fruit, such as peas, beans, &c.

Coal (Small), a sort of charcoal prepared from the spray and brushwood stripped off from the branches of coppice-wood, sometimes bound in bavins for that purpose, and sometimes charred without binding, and then it is called coming it together.

The wood they dispose on a level floor, and setting a portion of it on fire, they throw on more and more, as fast as it kindles, whence arises a sudden blaze, till all is burnt that was near the place. As soon as all the wood is thrown on, they cast water on the heap from a large scoop, and thus keep plying the heap of glowing coals, which stops the fury of the fire; while with a rake they spread it open, and turn it with shovels till no more fire appears. Then they shovel them up into great heaps, and when thoroughly cold, put them up in sacks, to be used by divers artificers to temper and anneal their several works. Small-coal was formerly much used in kindling fires, but there is now no demand for it for this purpose.

Coal-laws. Sea-coal brought into the Thames shall be sold by the chaldron, containing 36 bushels heaped up, according to the bushel sealed for that purpose at Guildhall.

Coals within the bills shall be carried in linen sacks, sealed by the proper officer, which shall be at least four feet four inches in length, and twenty-six inches in breadth; and sellers of coals by the chaldron, or less quantity, shall put three bushels of coals into each sack. 3 and 32 Geo. II. c. 26. and 27.

All sellers of coals are to keep a lawful bushel, which bushel and other measures shall be edged with iron and sealed; and using others, or altering them, incurs a forfeiture of 50*l.*

Any purchaser dissatisfied with the measure of any coals, may, on delivery to him of the meter's ticket, have the same remeasured, by sending notice thereof to the seller, and to the land coal-meter's office for the district in which the coals were sold; on which a meter (not being the same under whose inspection the coals were originally measured) must, within two hours, attend to remeasure the coals, and shall remeasure the same sack by sack, in the presence of the seller and purchaser (if they attend), and also in the presence of a meter from the two other districts (whose attendance within London and Westminster is enforced by a penalty of 5*l.* but not in Surry); for this attendance the purchaser is to pay each coal-meter attending 6*d.* per chaldron. If the coals prove deficient measure, the seller shall forfeit 5*l.* for every bushel deficient, and also forfeit the coals to the poor. The meter under whose inspection the coals were measured at the wharf, shall also forfeit 5*l.* per bushel deficient, to be recovered (if not in five days) of the principal coal-meter; and coal-porters 2*s.* 6*d.* per bushel. The carman is to be paid 2*s.* 6*d.* for his horses, &c. for each hour, whilst the coals are remeasuring.

Any coal-factor receiving, or coal-owner giving, any gratuity for buying or selling any particular sort of coals, and selling one kind of coals for and as a sort which they really are not, shall forfeit 500*l.* 3 Geo. II. c. 26.

Owners or masters of ships shall not enhance the price of coals in the river Thames, by keeping turn in delivering coals there, under the penalty of 100*l.* 4 Geo. II. c. 30. Contracts between coal-owners, &c. and merchants of ships for restraining the buying of coals are void, and the parties shall forfeit 100*l.* 9 Ann. c. 28.

Wilfully and maliciously setting on fire any mine, pit, or delph of coal, or cannel-coal, is felony without benefit of clergy. 10 Geo. II. c. 32.

Setting fire to, demolishing, or otherwise damaging, any engine or any other thing belonging to coal-mines, is felony and transportation for seven years. 9 Geo. III. c. 29.

COAL-BLACK. *a.* (*coal* and *black.*) Black in the highest degree (*Dryden*).

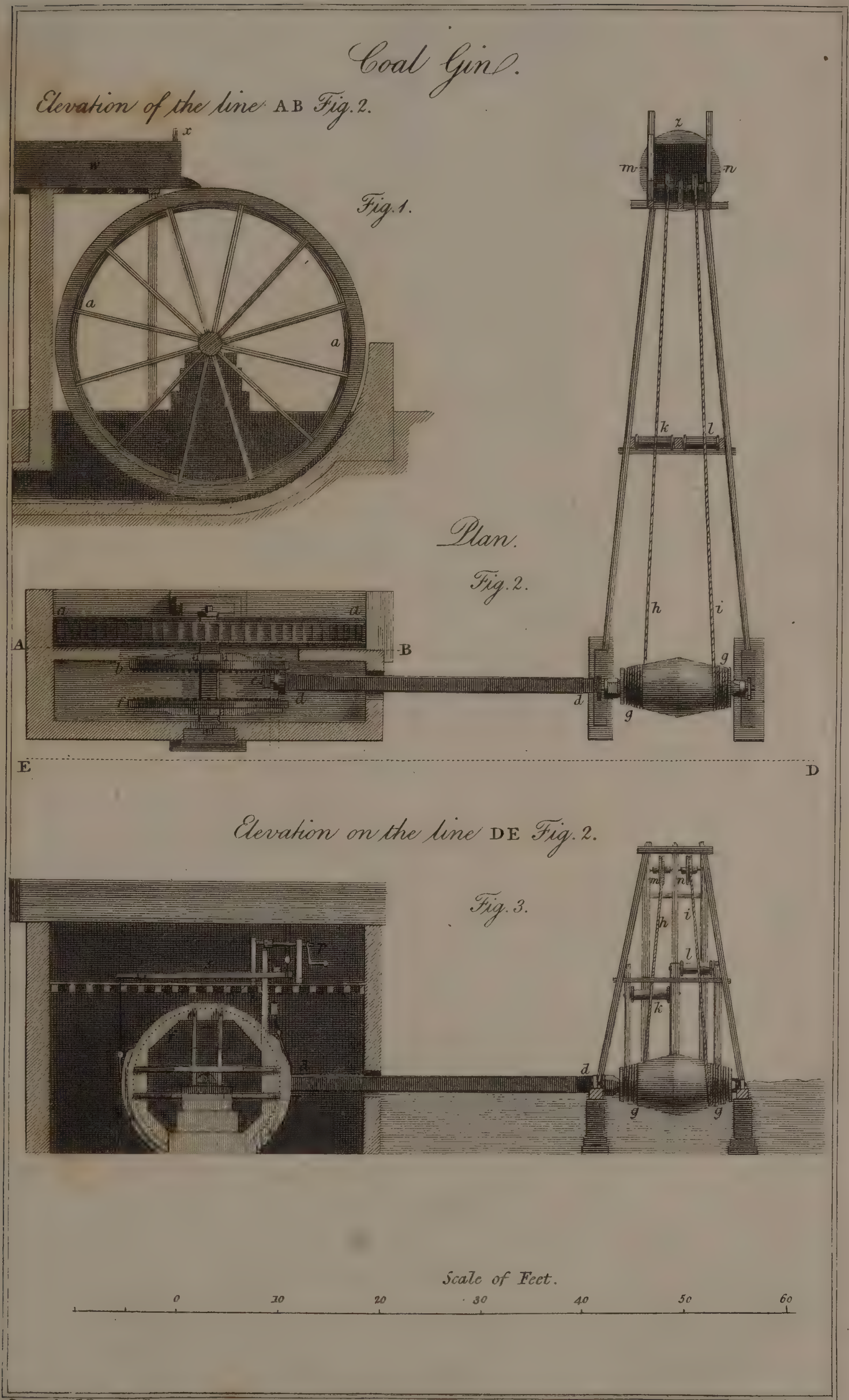
COAL-BLEND. See SULFUR.

COAL-FISH. See GADUS.

COAL GINS, machines used for drawing up coals, &c. from the mines: they are constructed in various ways; the most common are worked by horses, while those on a larger scale are worked by a water wheel. A machine of this sort is represented in Plate 42, where fig. 1, is an elevation of the water wheel, fig. 2, a plan of the whole machine, and fig. 3, an elevation on the line DE in fig. 2: the same letters are used as far as they will apply in all the figures: *aa* is the water wheel turning on pivots at the end of the axis, which are supported on masonry; *bf* are two face cog wheels fixed upon the same axle, which alternately give motion to a pinion on the end of a long horizontal shaft; *dd* the diameter of the pinion, is somewhat less than the distance between the two wheels *bf*, so that it cannot work or gear in the cogs of both wheels at once. One of the pivots of the horizontal shaft *dd*, turns in an upright lever *e*, which works on a centre on the ground. This lever can be moved sideways, and thus cause the pinion to work with either of the wheels *b* or *f*: on the end of the horizontal shaft *dd* is an iron box, which receives the projecting end of the pivot of the large barrel *gg*, on which the ropes are to be coiled. These ropes after passing over rollers *k* and *l*, and pulleys *m* and *n*, descend into the pit (represented in fig. 2 by a dark space) and have hooks at their ends to receive the curves in which the coals are drawn up. The barrel *gg* is in the form of two frustums of cones, having one common base. The ends of the ropes are fastened to the barrel at the smallest ends of the cones, in order that when the curve is at the bottom of the pit, and a great length and weight of rope are to be raised beside, the rope shall wind upon a small barrel which gradually increases in size as the rope rises and the resistance becomes less: by this means the power required to turn the barrel will be always the same, whether the ropes are wound upon it, or suspended in the pit. The building which contains the wheel work, supports a floor just above the wheels as is seen in fig. 3: the lever *e* passes through the floor in an oblong hole, and has a piece of iron fastened upon it, which has teeth cut in it, which take into the teeth of a pinion upon an axis, turned by a winch P. A man stands at this winch, and by turning it round he moves the lever *e*, and thus throws the pinion in gear with the opposite wheel, and causes the barrel to revolve in a contrary direction, and to wind up that rope which it let down before. The two cog wheels *b* and *f*, are each surrounded by a semicircular ring of wood *rr*, one end of which is fastened by means of a short iron rod, to a strong beam going across the house: the other end of the beam has an iron rod fastened to it, to connect it with a lever *s* which is loaded at the long end, and when permitted to descend, closes the gripe so tight round the wheel as to stop the motion of the water wheel and all the machinery. The long ends of the levers are taken up occasionally by means of a tackle of pulleys, thus removing the pressure of the gripes from the wheels, and permitting them to turn freely.

The water wheel is overshot, and the water is brought to it by the trough or reservoir *w*, fig. 1; the quantity of water which falls upon the wheel being regulated by the opening of the shuttle *x*. The pentrough is supported on one side by the wall of the building between the water wheel, and the rest of the machinery; on the other side it is sustained by a vertical beam seen distinctly in fig. 1. After the water has filled the buckets of the wheel, and descended in them to the ground, it passes under the wheel, and is conveyed away by the arch: the water may be brought from a distance if it be practicable; or it may be raised into the trough by a steam engine, put as occasion requires.

The pulleys *mn*, figs. 2 and 3, are elevated more than twenty feet above the level of the axis of the barrel, and are supported by a framing over the mouth of the pit: a heap is always formed round the pit, by the stuff which is excavated; upon this heap the frame is erected as shewn in fig. 3; the mouth of the pit is partially covered by a flooring *z*, upon which the attendants stand to land the corves of coals when they arrive high enough to be easily drawn upon the floor; immediately a signal is given by a bell to the man in the room over the cog wheels, who slackens the rope of the tackle which takes up the end of the levers *s*: this closes the gripes round the wheels, and stops the water wheel; he then turns the winch *p*, and by that means disengages the pinion from the wheel which was turning it, and permits the barrel to run down, that the corve may be landed. The attendants at the pit head now unhook the full corve, and hook on an empty one, launching it over the pit; in the same manner the workmen at the bottom of the mine detach the empty corve, and replace it by a full one. During this time, the man in the mill-house had by turning the winch *p*, thrown the pinion in gear with the opposite cog wheel; and upon the signal being given, he draws up the gripe levers *s*, and permits the water wheel to resume its motion, turning the barrel in a contrary direction, and



Drawn by J. Farey. Junr.

Mutlow Sc. Russell Ct.

Published by G. Kearsley, Fleet Street, Decr. 1st. 1808.

drawing up that rope which it let down before, and letting down the other. A lever is connected with the shuttle *x*; and the same rope which lets down the levers to close the gripes also closes the shuttle, and prevents the water running waste while the water wheel is at rest; and as soon as the levers are drawn up, the shuttle is opened also.

The most improved coal engines have a small machine turned by the gudgeon at the end of the barrel or some other part, which registers the number of draughts which have been made from the mine: an ingenious machine of this sort was presented to the Society of Arts by Mr. John Antis.

The celebrated Mr. Smeaton erected several machines similar to the above in different parts of England.

Mr. Gilbert Gilpin, of Old Park iron-works, proposes to use chains instead of ropes in coal-gins. For this purpose, a spiral groove is formed round the barrel by narrow slips of iron, fastened about its surface in continuation, so that each revolution of them shall be at a regular distance from those next adjoining, equal to the thickness of a link of the chain. In the spiral groove thus formed, the edges of every second link of the chain fall as the barrel is turned round, which keeps them in a vertical position, while the intervening links lie flat on the edges of the iron slips; when these slips (called tire by Mr. Gilpin, from their similarity to the tire of wheels) are to be fastened on conical surfaces, they are shaped so that their section forms a moulding of two elevations, the upper of which is double the height of the lower; by which the surfaces of the grooves are made to assume a level position along the face of the cone, as they are formed of the upper half of the lower slip, and of the lower half of the upper slip next to each other.

Mr. Gilpin recommends the use of conical barrels, formed (like those above described) of two frustums of cones with their bases joining in the middle, each frustum to work a separate chain, by which the weight of the ascending chain will tend to balance that of the descending chain more equally. He proves mathematically, that by making the weight of the basket of coal to that of the chain, and the perimeters of the extremities of the frustums which form the barrel, to each other in the proportion of two to one, a maximum is obtained by which a barrel of this description requires one-third less momentum (and consequently one-third less expence) to work it than a cylindrical one. The pulleys over which the chains pass to the pits are formed with grooves also to keep the chains even. The expence of chains used in this way is only about a twenty-fourth part of that of hempen ropes. The principal disadvantage seems to be that chains shew not such obvious signs before they break as ropes do; but often snap suddenly and destroy every thing connected with them. For a more minute account of Mr. Gilpin's contrivance, see Trans. Soc. Arts, vol. xxv.

Coal-mine. *s.* A mine in which coal is dug.

Coal-pit. *s.* A pit made in the earth for digging coal (*Woodward*).

Coal-stone. *s.* A sort of cannel coal. See Bitumen.

Coal-work. *s.* A coalery (*Felton*).

CO'ALERY. *s.* A place where coal is dug (*Woodward*).

To COALE'SCE. *v. n.* (*coalesco*, Lat.) 1. To unite in masses (*Newton*). 2. To grow together; to join.

COALE'SCENCE. *s.* (from *coalesce.*) Concretion; union.

COALI'TION. *s.* (*coalitum*, Lat.) Union in one mass or body (*Bentley*).

CO'ALY. *a.* Containing coal (*Milton*).

COAMINGS, in ship-building, are those planks, or that frame, forming a border round the hatches, which raise them up higher than the rest of the deck. Loop-holes, for muskets to shoot out at, are often made in the coamings, in order to clear the deck of the enemy when the ship is boarded.

COANGO, a river of Africa, which rises in the interior parts, and, when near the sea, changes its name to Zaire, or Zaira. See Zaire.

COANZA, a river of Africa, which rises far in the interior parts, and, after crossing the kingdom of Angola, runs into the Atlantic; thirty miles N.E. Cape Ledo.

COAPTA'TION. *s.* (*con* and *apto*, Lat.) The adjustment of parts to each other (*Boyle*).

To COA'RCT, Coa'rctate. *v. a.* (*coarcto*, Lat.) 1. To straiten; to confine (*Bacon*). 2. To contract power; to restrain (*Ayliffe*).

COARCTATE. In botany, squeezed or pressed together. Compact, *with.* Coarctate branch, condensed branches. Opposed to divergent. (See Condensed.) Coarctate peduncles, condensed peduncles; opposed to patulate. Coarctate panicle, a close or contracted panicle; opposed to diffuse.

COARCTA'TION. *s.* (from *coarctate.*) 1. Confinement; restraint to a narrow space (*Bacon*). 2. Contraction of any space (*Ray*). 3. Restraint of liberty (*Bramhall*).

COARI, a river of South America, which runs into the river of the Amazons, in Terra Firma.

COARSE. *a.* 1. Not refined (*Shakspeare*). 2. Not soft or fine. 3. Rude; uncivil; rough of manners. 4. Gross; not delicate (*Thomson*). 5. Inelegant; unpolished (*Dryden*). 6. Unfinished by art or education (*Arbuthnot*). 7. Mean; not nice; vile (*Otway*).

CO'ARSELY. *ad.* (from *coarse.*) 1. Without fineness. 2. Meanly; not elegantly (*Brown*). 3. Rudely; not civilly (*Dryden*). 4. Inelegantly (*Dryden*).

CO'ARSENESS. *s.* (from *course.*) 1. Impurity: unrefined state (*Bacon*). 2. Roughness; want of fineness. 3. Grossness; want of delicacy (*L'Estrange*). 4. Roughness; rudeness of manners (*Garth*). 5. Meanness; want of nicety (*Addison*).

COAST. *s.* (*coste*, French.) 1. The edge or margin of the land next the sea; the shore (*Dryden*). 2. Side (*Newton*). 3. *The* COAST *is clear*. The danger is over; the enemies have marched off (*Dryden*).

To COAST. *v. n.* To sail close by the shore; to sail within sight of land (*Arbuthnot*).

To COAST. *v. a.* To sail by (*Addison*).

COAST CASTLE (Cape), the principal settlement of the English on the coast of Guinea, with a strong citadel. Lat. 5. 6 N. Lon. 0. 0.

CO'ASTER. *s.* He that sails timorously near the shore (*Dryden*).

COASTING, in navigation, the act of making a progress along the sea-coast of any country. This is generally done under the direction of a person who knows the nature of the sea near the coast, as to sands, rocks, currents, &c. and who is called a coasting pilot.

COAT. *s.* (*cotte*, Fr.) 1. The upper garment (*Samuel*). 2. Petticoat; the habit of a boy in his infancy; the lower part of a woman's dress. 3. Vesture, as demonstrative of an office (*Swift*). 4. The hair or fur of a beast (*Milton*). 5. Any tegument or covering (*Derham*). 6. That on which the ensigns armorial are portrayed (*Dryden*).

To COAT. *v. a.* To cover; to invest.

COAT, or COAT OF ARMS, in heraldry, a habit worn by the ancient knights over their arms both in war and tournaments, and still borne by heralds at arms. It was a kind of fur-coat, reaching as low as the navel, open at the sides, with short sleeves, sometimes furred with ermine and hair, upon which were applied the armories of the knights embroidered in gold and silver, and enamelled with beaten tin coloured black, green, red, and blue; whence the rule never to apply colour on colour, nor metal on metal. The coats of arms were frequently open, and diversified with bands and fillets of several colours, alternately placed, as we still see clothes scarleted, watered, &c. Hence they were called devises, as being divided and composed of several pieces sewed together: whence the words false, pale, chevron, bend, cross, saltier, lozenge, &c. which have since become honourable pieces, or ordinaries of the shield. (See CROSS, BEND, CHEVRON, &c.) Coats of arms and banners were never allowed to be worn by any but knights and ancient nobles.

COAT. In anatomy. See TUNIC.

COAT OF MAIL, a kind of armour made in form of a shirt; consisting of iron rings wove together netwise. See MAIL.

COATING, in electricity, denotes a covering of sheet-lead, tin-foil, or any other conducting substance, applied to the Leyden phial, or to any electric body, and serving to accumulate the electricity, to increase the force of the charge, and to facilitate the operation of discharging. The first person who discovered the use of coating in electrical experiments, was Dr. Bevis: it was first applied to the Leyden phial, but has been since extended to a great variety of other electrical substances. When glass plates, or jars, sufficiently wide at the neck, are to be coated, the best method is to coat them with tin-foil on both sides, which may be fixed on the glass with varnish, gum-water, bees-wax, &c. but if the internal coating cannot be conveniently introduced, brass filings may be used, and stuck to the surface of the glass with gum-water, or bees-wax, &c. However, care should be taken that the opposite coatings do not come too near to each other: that of glass jars should be kept at the distance of at least two inches from the top. Glass phials may be coated very easily in the following manner: take bismuth two parts, lead and tin, of each one part, melt them together, and carefully skim off the dross; remove the mixture from the fire, and before it grows cold add ten parts of hot mercury; stir the whole together, and the amalgam when cold is fit for use. Let the bottle to be coated be quite new and clean; put into it a sufficient quantity of the amalgam, incline the bottle, and gently turn it round, that the composition may adhere to every part, pour out the superfluous amalgam, and the phial will be beautifully coated.

COATING, or LORICATION, in chemistry, is employed for the purpose of defending certain vessels from the immediate action of fire, or the effects of sudden heat. The coating is usually formed of clay, or of a mixture of clay with sand or other substance, and may be applied either externally or internally as occasion may require. Retorts may be coated in the following manner: take of clay and sand equal parts, make them into a thin paste, with fresh blood prevented from coagulating by agitation till it be cold, and diluted with water; add to this paste some hair and powdered glass; with a brush dipt in this mixture besmear the retort, and when the first layer is dry, let the same operation be repeated twice or oftener, till the coat applied be about one-third of an inch thick. On the other hand, crucibles, furnaces, &c. must evidently be coated on the inside; the composition recommended by Pott as the best for this purpose, is formed of two parts of Spanish chalk, and one part of powdered tobacco pipes.

To COAX. *v. a.* To wheedle; to flatter (*L'Estrange*).

CO'AXER. *s.* A wheedler; a flatterer.

COB. (A word often used in the composition of low terms; corrupted from cop, Saxon, *kopf*, German.) The head or top.

COB. *s.* 1. A sort of seafowl; called also seacob. 2. A spider; whence cobweb.

COBA'LTUM. Cobalt. In mineralogy, a genus of the class metals. Blueish grey, with often a shade of red; hardish, very brittle; attracted by the magnet; specific gravity 8,150; in a red heat gradually becoming a blue powder, which grows deeper to a deep black blue, in a violent heat burning with a red flame; when fused with borax, producing a fine blue glass; giving a reddish colour to its solution in nitric acid, and precipitating a blue powder,

with the addition of potash. Dissolved in muriatic acid, it forms a sympathetic ink. Eight species. The following are the chief:

1. C. nigrum. Black cobalt: black cobalt ore: black oxyd or calx of cobalt. Inconspicuous, of a dusky colour, emitting no arsenical vapours when thrown on hot coals. Two other species: one loose and friable; the other indurated. Found in the mines of Great Britain, Austria, Saxony, Hungary, &c.: when rubbed with the nail it becomes shining. Specific gravity, from 3,000 to 4,000.

2. C. ochraceum. Brown cobalt ore, or earthy oxyd of cobalt. Two other species; one a dull yellow, called yellow cobalt ore or ochre; the other green, in the form of minute capillary crystals, called green cobalt ore or oxyd of cobalt. Found in the mines of Great Britain, and various parts of the continent; generally deposited on other ores, though sometimes found botryoidal, or kidney-shaped. It very readily forms a gloss of various shades of blue.

3. C. cobaltigo. Red cobalt. Arseniat of cobalt. Radiated, red with a glassy lustre, emitting arsenical vapours when thrown on hot coals. Found near the lakes of Killarney in Ireland, and in most other places where the other ores of cobalt abound, sometimes massive, sometimes in the state of flowers. It consists of cobalt united with the arsenical acid.

4. C. sulfuratum. Sulfurious cobalt. Found in Sweden and Hungary, of a tin white colour and lustre, emitting sulfurous vapours when thrown on hot coals, and at length leaving a pure oxyd of cobalt.

5. C. pyriticosum. White cobalt ore, of a steel-white colour and lustre, emitting sulfurous vapours before the blow-pipe, and when heated with powdered charcoal, leaving a magnetic lead. Found in the mines of Sweden, Hungary, Saxony, and Bohemia: contains cobalt combined with sulfur and iron.

6. C. crystallinum. Grey cobalt ore, of a blueish tin colour and lustre, emitting sulfurous and arsenical vapours before the blow-pipe, and leaving a magnetic lead. Found in the mines of Cornwall, and the other parts of Europe. It consists of cobalt, combined with various proportions of arsenic, sulfur, and iron.

Cobalt in the ore is always mixed with arsenic, often with iron, nickel, and sulfur, and sometimes with bismuth and silver. To analyse these ores, the following process may be used. Reduce the ore to powder, and dissolve it in nitro-muriatic acid by means of heat. Let the mixture stand to settle, then decant and filter: the residue consists of sulfur and silex. To the fluid which passes through the filter, add a solution of carbonat of potash; and when a precipitate ceases to be formed, filter again; wash the precipitate with distilled water, and dry it: this is composed of iron, arsenic, and cobalt. Dissolve it in diluted nitric acid, and decompose it by adding liquid ammonia; collect the precipitate thus formed, dissolve it in acetous acid, and evaporate slowly, by which means the iron is precipitated in the form of a yellow or red powder, which is to be separated by filtration. To the arsenic and cobalt in solution, add liquid ammonia till the odour of the latter predominates; when the arsenic will be separated. The cobalt remaining in solution may be obtained by evaporation, in the state of an oxyd, which may be reduced by mixing it with two or three other parts of black flux and one of borax, and then exposing it to a violent heat. (See Accum's Chemistry.) When the object is to extract the cobalt alone, without regard to the other substances which compose the ore, the following method is employed. The ore, reduced to a fine powder, is mixed with charcoal or sawdust, and roasted slowly till the arsenic is completely driven off. The residue is calcined in a strong red heat, and then mixed with about four parts of reducing flux, composed of equal parts of tartar and carbonat of potash; after which it is to be gradually heated in a large covered crucible, until it be exposed to a heat sufficient to melt iron. On cooling, a button of cobalt subsides at the bottom of the vessel.

But the cobalt thus obtained is by no means in a state of purity. Many extraneous matters continue to adhere to it, particularly nickel, iron, or arsenic, to separate which has always been a point of considerable difficulty. The process by which Tromsdorf effected this point, is as follows. To four parts of zaffre, an impure oxyd of cobalt, add one part of nitre, and half a part of charcoal in powder; let the whole be mixed carefully, and projected in small quantities into a red hot crucible three or four times successively, adding each time new portions of nitre and charcoal. Expose the mass, mixed with one part of black flux, for an hour to a red heat: after cooling, separate the metallic cobalt, pulverize it, mix it with three times its weight of nitre, and again detonate as before. Pulverize the mass, lixiviate and filter many times; heat the residue with nitric acid, and evaporate to dryness. Redissolve in nitrous acid, and decompose the nitrat of cobalt thus resulting, by means of potash, wash the precipitate, and reduce completely by heat. The method practised by Lampadius is very nearly similar, excepting that the detonation is not so frequently repeated, and a little manganese is added with the nitre previous to the last heating: the method, upon the whole, is more simple than that of Tromsdorf, but then the result is somewhat less pure. Dr. Richter has written on the different methods of purifying cobalt, particularly on the separation of nickel from cobalt, and of cobalt from nickel, in the large way. (See Philos. Mag. xix. 51.) According to other methods, when the bismuth and arsenic are separated, caustic potash is used to decompose the nitrated solution of the zaffre, and caustic ammonia to dissolve the oxyd of cobalt, which may be again separated in the state of a pure oxyd, either by evaporation to dryness, or by boiling with caustic potash; the oxyd may then be reduced to a metallic state in the usual manner. After all, however, it re-

quires great care and address to obtain this metal in a state of absolute purity, on account of the strength of affinity which subsists between it and the substances with which it is found united.

The first person who obtained metallic cobalt from the mineral of the same name was Brandt, a Swedish chemist, in 1733. Since then the discovery has been confirmed and extended by Bergman, Tassaut, the School of Mines at Paris, Thenard, &c.

Cobalt, when pure, has the whitish grey colour of tin, and but very little brilliance; it is fragile, and easy to pulverize; it is difficult to fuse, requiring a heat equal to that necessary to melt cast iron; it has scarcely any taste or smell; it is soluble in nitric acid, imparts a blue colour to glass that is melted with it; and partakes with iron of magnetic properties. Its specific gravity is about 8.538.

Muriatic acid acts on cobalt with great difficulty; it dissolves, however, the oxyds of this metal much more easily, especially if assisted by heat. The pure metal may be dissolved in nitro-muriatic acid, and the muriat of cobalt produced by either of these methods, has the property, when used for the purpose of writing upon paper, of assuming a beautiful green colour on exposure to a gentle heat, though the letters were invisible when first written, and will become so again on cooling. A solution of oxyd of cobalt in acetic acid, which may be prepared by the assistance of heat, is endued with a similar property, differing only in the colour it assumes on exposure to heat, which in this case is blue. The two fluids of which we have been speaking have long been known by the title of SYMPATHETIC INK, under which term may be found the particulars of the methods adopted in preparing them, and an account of the various phenomena they exhibit. Sulphuric acid requires a boiling heat to dissolve cobalt; phosphoric acid dissolves only its oxyds, as is the case with fluoric, tartaric, and other acids. The oxalic and some other acids dissolve the metal. Cobalt will not combine with carbon, hydrogen, azotic gas, nor muriatic acid gas; but with several of the metals it forms alloys, which, however, are but little known, and not applied to any use. Sulphuret and phosphuret of cobalt, may be formed by combining sulphur and phosphorus with the metal.

It is not easy to ascertain correctly the affinities of this metal: according to Bergman they are as follow: cobalt, iron, nickel, arsenic, copper, gold, platina, tin, antimony, zinc, phosphorus, sulphur. Oxyd of cobalt, oxalic acid, muriatic, sulphuric, tartaric, nitric, phosphoric, fluoric, mucic, succinic, citric, lactic, acetic, arsenic, boracic, prussic, carbonic.

In its metallic state, cobalt is scarcely of any use; but an impure oxyd of it, long known under the name of zaffre, is employed to impart a blue colour to fusible and vitreous substances; the pure oxyd will have the same effect; and its colouring power is so great that a single grain of pure oxyd, or zaffre in proportion, will give a very deep blue to half an ounce of glass. If a greater proportion be used, the colour will be so deep as to be scarcely distinguishable from black. Of ZAFFRE, with the addition of sand, is formed that deep blue glassy substance which bears the name of SMALT, and which is applied as a colouring to a great variety of purposes. See those two words.

COBALTIC ACID, a name given by Brugnatelli to a substance which he supposed to be a peculiar acid. From later experiments, however, it appears that his opinion was ill founded; and Bucholz, who took much pains to ascertain the point, says that the supposed acid is probably nothing else than arsenical acid, united with ammonia, and a little oxyd of cobalt. See his Paper in Scherer's Journal, No. li., or Phil. Mag. xviii. 97.

CO'BALT. *s.* A marcasite, plentifully impregnated with arsenick (*Woodward*).

COBBE', in geography, the capital town of Dar-jûr, in Africa, situated almost in the direct road from the north to the south of the country. Lat. 14. 11 N. Lon. 28. 8 E. The town is more than two miles in length, but very narrow. The customs, employments, &c. of its inhabitants, are described in Browne's Travels in Africa, ch. xvii.

To CO'BBLE. *v. a.* (*kol'ler*, Danish.) 1. To mend any thing coarsely (*Shakspeare*). 2. To do or make any thing clumsily (*Bentley*).

CO'BBLER. *s.* (from *cobble*.) 1. A mender of old shoes (*Addison*). 2. A clumsy workman in general (*Shakspeare*). 3. Any mean person (*Dryden*).

CO'BIRONS. *s.* (*cob* and *iron*.) Irons with a knob at the upper end (*Bacon*).

COBI'SHOP. *s.* (*con* and *bishop*.) A coadjutant bishop (*Ayliffe*).

COBI'TIS. Locke. In zoology, a genus of the class pisces, order abdominalia. Head small, oblong, naked; eyes in the upper part of the head; nape flat; gill-membrane from four to six-rayed; the covers of one piece shutting beneath; body covered with mucus, and small, thin, easily deciduous scales; nearly of an equal thickness from head to tail; back straight with a single fin; lateral line hardly conspicuous; vent nearer the tail; tail rounded. Six species. Europe, Asia, and America. See Nat. Hist. Pl. LIII.

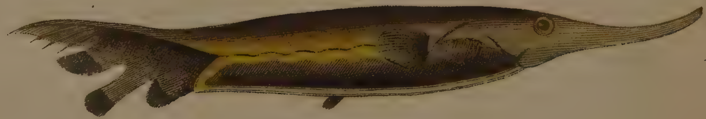
1. C. anableps. Two cirri; head depressed, eyes prominent. Inhabits the shores of Surinam.

2. C. barbata. Bearded locke. Cirri six; head unarmed, compressed. Inhabits the fresh waters of Europe and Asia; from three to four inches long; keeps at the bottom of the water on the gravel; feeds on worms and insects; is very fertile, and spawns in March and April; body finely varied with white, cinereous and blackish: flesh exquisite.

3. C. tœnia. Groundling. Cirri six; a forked spine under each eye. Inhabits Europe; keeps under stones in small brooks; when handled makes a hissing noise; feeds on

Four-eyed Anableps

Spiny Loche.



Mailed Centriscus

Drawn from Life by S. Edwards

London Publish'd by Geo. Kearsley, Fleet Street Mar. 2. 1809.

worms, aquatic insects, and the spawn of other fishes: body five inches long, yet lowish, with four rows of brown spots.

4. C. fossilis. Cirri eight; a forked spine under each eye. Inhabits boggy places, and muddy streams of Europe; is extremely fertile, and preys on worms, insects, smaller fishes, and fat earth; hides itself under the mud in winter, and is very restless before a storm, disturbing the water, and getting as near as possible to the surface. About twelve inches long; flesh good.

5. C. heteroclita. Mud-fish. Head without cirri; dorsal and anal fins spotted with white; tail barred with black. Inhabits Carolina; about a palm long.

6. C. Japonica. Head without cirri; depressed; jaws toothed. Inhabits Japan; five inches long; body roundish.

COBLE, a boat used in the turbot fishery. It is about a ton burden, and rowed with three pairs of oars.

COBLENTZ, a city of Germany, in the circle of the Lower Rhine, in the electorate of Treves, situated at the conflux of the Rhine and the Moselle: with a bridge of boats over the former, and a stone bridge over the latter. In the time of the Romans, the station of the first legion: after them the residence of the successors of Charlemagne. It was surrounded with walls in the year 1249, and fortified since that time. The elector has a palace here, built about twelve years since. It contains three large churches, two of which are collegiate, a college, eight convents, &c. The town was formerly Imperial. It was taken by the French in the month of October, 1794: thirty-six miles N.W. Mentz, fifty-four N.E. Treves, and eighty-two E.S.E. Liege. Lat. 50. 24 N. Long. 7. 32 E.

CO'BNUT. *s.* (*cob* and *nut.*) A boy's game.

CO'BSWAN. *s.* (*cob* and *swan.*) The head or leading swan (*Ben Jonson*).

COBURG, a town of Germany, in the circle of Franconia, capital of a principality of the same name, with a college, a fort, and a castle. Lat. 50. 22 N. Long. 11. 18 E.

CO'BWEB. *s.* (*kopweb*, Dutch.) 1. The web or net of a spider (*Spenser*). 2. Any snare or trap (*Swift*).

COBWEBBED (*arachnoideus*). In botany, covered with a thick interwoven pubescence. Applied to the leaf, peduncle, and calyx.

COCCI'FEROUS. *a.* (κοκκὸς and *fero.*) Plants are so called that have berries (*Quincy*).

COCCINELLA. Lady-bird. In zoology, a genus of the class insecta, order coleoptera. Antennas clavate; the club solid; anterior feeler hatchet-shaped, posterior filiform; thorax and shells margined; body hæmispherical; abdomen flat.

These chiefly feed on plant-lice, and are very serviceable in purging vegetables of the myriads with which they are often infested. A hundred and sixty-four species scattered over the globe, and subdivided into the following sections.

A. Shells red or yellow, with black dots.
B. Shells red, with yellow dots.
C. Shells red or yellow, spotted with white.
D. Shells yellow, spotted with red.
E. Shells black, spotted with red.
F. Shells black, spotted with white or yellow.

The species chiefly worth noticing are,

1. Coccinella septempunctata. Common lady-bird, or lady-cow. Shells red with seven black dots. Inhabits Europe, and is said, as well as other insects of the order coleoptera, to have the singular property of giving immediate and effectual relief in the most violent paroxysms of toothach, by rubbing them between the thumb and finger to the affected tooth. It proceeds from a larva of disagreeable appearance, of a lengthened oval shape, with a sharpened tail of a black colour, varied with red and white specks, and of a rough surface: it resides on various plants, and changes to a short, blackish, oval chrysalis spotted with red, which is metamorphosed to this beautiful insect in the month of May and June. See plate LV.

2. C. octodecim-punctata. Shells yellow, with eighteen black dots, the last arched. Sides of the thorax yellow; very beautiful; about the size of the common lady-bird. Found in the gardens of Europe.

COCCINELLA. In the older pharmacopœias (*coccinella*, from *coccus*, a berry; from its resemblance to a berry.) Cochineal. The female of a species of insect called coccus cacti, that is found on, and collected in South America, from the opuntia or Indian fig-tree. In medicine, it possesses stimulating qualities, and is ordered by the college in the tinctura cantharidis—cardamomi composita, and cinchonæ composita; but, chiefly, on account of the beautiful red colour which it imparts to them. See COCCUS.

COCCOCY'PSILUM, in botany, a genus of the class tetrandria, order monogynia. Calyx four-parted, superior; corol funnel-form; berry inflated, two-celled, manyseeded; style semibifid. Three species: natives of the West Indies; one with an herbaceous, the two others with shrubby erect stems.

COCCOGNIDIA. Grana cnidia. Cocci cnidii. The seeds of the daphne mezereum are so termed. They are violently purgative. See DAPHNE.

COCCOLOBA. Sea-grape. In botany, a genus of the class octandria, order trigynia. Calyx five-parted, coloured; corolless: berry calycine, one-seeded. Thirteen species, almost all natives of the West Indies or South America: the greater number, possessed of woody stems; but one or two as c. pubescens, a tree nearly thirty feet high, with a hard, heavy, red timber, and wrinkled leaves.

COCCOTHRAUSTES. See LOXIA COCCOTHRAUSTES.

CO'CCULUS INDICUS, (*cocculus*, κοκκυλος, dim. of κοκκος, a berry). The berry so called is rugous and kidney-shaped, and contains a white nucleus; it is the produce of the me-

nispernum cocculus; foliis cordatis, retusis, mucronatis; caule lacero, of Linnéus. The berries possess an inebriating quality; and are supposed to impart that power to most of the London porter.

COCCUM (κοκκον,) a grain or seed. Linnéus applies this term to some fruits of a particular structure, having several cells, with a single seed in each. Thus euphorbia and thea have a tricoccous fruit; geranium has a pentacoccous or five-grained fruit.

COCCUS. Cochineal-insect. In entomology, a genus of the order hemiptera. Snout seated in the breast; antennas filiform; abdomen bristly behind; male with two erect wings, but without poison: female apterous. Forty-six species that inhabit various trees and plants in the different quarters of the globe: extremely fertile, and extremely troublesome in hot-houses and green-houses. The male is very active, with an oblong body and ovate abdomen; its tail furnished with a style and two long bristles. The female has a body nearly globular, and is slow, inactive, and fixed to different parts of plants. Among ourselves the trees chiefly infested seem to be the oak, elm and maple. See Nat. Hist. Pl. LV.

We can select but a few specimens of this extraordinary insect. The following are those most worthy of remark.

1. C. hesperidum. Green-house bug. Brown colour, with a glossy polish. Found on various evergreen plants in the green-houses of most countries. It dies in the act of giving birth to a numerous race of young, hatched from the eggs included in the husk or body of the parent. The male is a small dipterous or two-winged fly.

2. C. adonidum. Body purplish-black; crown tuberculate. Found also in green-houses, chiefly on the evergreen Asiatic trees. The female when full grown measures something more than the fifth part of an inch in length, and has some resemblance to a small millepede. The male is very small, rose-coloured, somewhat mealy, with semi-transparent milk-white wings. The young, as in the former species, are hatched under the husk or body of the parent, shortly after her death, and in great numbers. Both these species have been imported into our own country, with exotic plants, from the warmer climates of Asia and Africa.

3. C. cacti. Officinal cochineal insect. Body depressed, downy, transversely wrinkled; abdomen purplish: legs short, black; antennas subulate, a third part shorter than the body. Found on the cactus coccinellifer, and cactus opuntia or prickly pear. The female is the true cochineal of the shops, so well known for its valuable uses in dyeing and painting. When ground and prepared it is sold under the name of carmine. The female in its full sized pregnant and torpid state, bears so small a proportion to its former, or creeping state, that its antennas, legs, and proboscis are scarcely discernible; whence it has much the appearance of a berry, and was so regarded formerly. The male is a small and rather slender dipterous fly about the size of a flea, active and lively, and dispersed in small numbers among the females, probably in the proportion of one to a hundred and fifty or two hundred.

4. C. ilicis. Kermes insect. Body glossy brown with white down. When immersed in vinegar and dried, it produces a colouring matter known by the name of kermes, and admitted as an article of the materia medica into most pharmacopœias. The female insect which produces the colouring matter is found adhering in its advanced or pregnant state to the shoots of the quercus coccifera (the ilex aculeata cocciglandifera of Caspar Bauhine) under the form of smooth reddish-brown or blackish powdery grains or balls of the size of small peas. The tree or shrub grows plentifully in many parts of France, Spain, Greece, and the islands of the Archipelago. Before the discovery of America, and the introduction of the coccus cacti, this species was regarded as of the utmost importance in dyeing scarlet, and a very extensive article of commerce. Its estimation is now, however, considerably diminished. The scarlet in grain, and grain-dyed scarlet cloths were so denominated from its having been first suspected that the kermes insect was a real grain, seed, or berry on the shoots of the ilex. It is still said that, though less brilliant than the cochineal scarlet, the kermes dye is far more durable: the deep, red, ox-blood colour exhibited in most of our old tapestries is of this insect entirely.

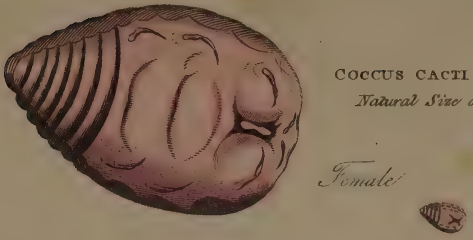
5. C. polonicus. Body oblong-ovate, purple, or chesnut. Found chiefly on the roots of the scelanthus perennis, only in cold climates: and may hence be regarded as the cochineal of the north, as it is often used by dyers, though it affords but an inferior hue.

6. Ficus. Lac-insect. Body red, antennas branched: tail two-bristled. Found on the ficus religiosa and indica: and producing the gum-lac of the shops. It is about the end of January that the female fixes herself, in consequence of pregnancy, to the succulent extremities of the young branches, and becomes torpid. She now secretes, apparently from the edges of the antennas, limbs and setæ of the tail, a spissid, pellucid liquor by which it becomes enveloped: and it is this secretion which forms the gum-lac: yet as a gum very nearly resembling it is obtained from the plaso and various other trees on which this insect fixes, by making incisions through their bark, it should seem that the secreted gum is an unchanged vegetable rather than an animal production. It is in the cells of this viscid matter that the female deposits her eggs. In March the different cells are completely formed; in November we find about twenty or thirty oval eggs, or rather young grubs occupying them, and apparently supported by the fluid they contain. When this fluid is all expended, the young grubs pierce a hole through the back of the mother, and walk off one by one, leaving

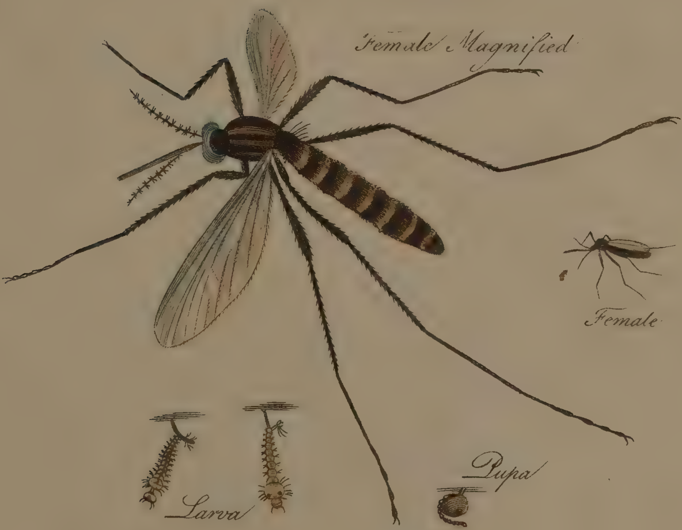
NATURAL HISTORY.

PL. LV.

COCCUS CACTI *or* COCHINEAL INSECT.
Natural Size and Magnified



CULEX *or* COMMON GNAT



COCCINELLA SEPTEM PUNCTATA
OR SEVEN SPOTTED LADY BIRD
Natural Size

Drawn from Life by S. Edwards.

London, Publish'd by G. Kearsley, Fleet Street, June 1, 1809.

their exuviæ behind, which is that white, membranous substance found in the empty cells of the stick-lac. The lac is of a deep red colour.

COCCYGE'US, (*coccygeus*, from κοκκυξ; because it is inserted into the coccyx.) A muscle of the os coccygis situated within the pelvis. It arises, tendinous and fleshy, from the spinous process of the ischium, and covers the inside of the sacro-ischiatic ligament: from this narrow beginning it gradually increases to form a thin fleshy belly, interspersed with tendinous fibres. It is inserted into the extremity of the os sacrum, and near the whole length of the os coccygis, laterally. Its use is to support and move the os coccygis forwards, and to tie it more firmly to the sacrum.

CO'CCYGIS OS, (*coccyx*, from κοκκυξ, the cuckoo, whose bill it is said to represent.) Os coccyx. A small irregular-shaped bone of the pelvis, attached to the apex of the sacrum, that sustains the rectum, and prevents the rupture of the perineum in parturition.

COCETUM, among the ancients, a drinkable liquor made of honey and poppies.

COCHIN, a country of India, on the coast of Malabar, situated to the northward of the Travancore. The inhabitants are idolaters, and it is said that the women take as many husbands as they please. The chief trade is in the hands of the Dutch.

COCHIN-CHINA, a country of Asia, bounded on the north by Ton-quin, on the east by the Indian sea, part of which, between the continent and the island of Hai-nan, is called the Gulf of Cochin-china; on the south it is bounded by Chiampa, and on the west by Laos and Cambodia. This kingdom contains about fifty good seaport towns, and is divided into six provinces, to each of which belongs a governor and a seat of justice. It is about 150 leagues in length, and thirty-five in breadth. The principal productions are rice of several sorts, millet, maize, pepper, indigo, saffron, carthamus, tea, silk, &c. Among the trees are the varnish-tree, cotton, mulberry, eagle-wood, aloes, rose-wood, and cinnamon. They have mines of gold and iron, and quarries of different kinds of marble. Among the animals are elephants, tygers, rhinoceroses, stags, antelopes, buffaloes, &c. The birds are various and abundant, and on the sea-coast are found those birds' nests, white as snow, so much sought for in Asia as a delicacy at the tables of the luxurious and rich. The sugar-cane is eaten as fruit in Europe: the inhabitants cultivate two kinds, and the commerce is immense: China alone is said to take, one year with another, 800,000 quintals. Other articles of commerce are odoriferous woods, ivory, musk, honey, wax, silk, and pepper. The manners of the inhabitants are simple; they are affable, mild, laborious, and hospitable: their chief nourishment consists in rice and fish. They believe in the transmigration of souls.

COCHINEAL. See COCCINELLA.

COCHINEAL-INSECT. See COCCUS.

CO'CHLEA, (*cochlea*, κοχλεα; from κοχγιζω, to turn round.) A cavity of the internal ear, resembling the shell of a snail, in which are observed, the modeolus, or nucleus extending from its basis to the apex, the scala tympani, scala vestibuli, and spiral lamina.

CO'CHLEA TERRE'STRIS. See LIMAX.

COCHLEA'RE, (*cochleare*, from *cochlea*, a cockle, whose shell its bowl represents.) A spoonful. In prescriptions it is sometimes abbreviated thus, coch. Cochleare magnum, is a table spoonful; cochleare medium, a desert or pap spoonful; and cochleare minimum, a tea spoonful.

COCHLEA'RIA. Scurvy-grass. A genus of the class tetradynamia, order siliculosa. Silicle turgid, rugged, many-seeded; with gibbous, obtuse valves. Nine species, scattered over different parts of Europe; of which four are common to the marshes or muddy shores of our own country. These are,

1. C. officinalis: lemon scurvy-grass, used largely for medicinal purposes, and especially as a refrigerant and corrector of acrimonious humours in the blood; and for this purpose cultivated in the gardens near the metropolis. Root-leaves, heart-roundish, petioled; stem-leaves oblong, somewhat sinuate, sessile; silicles globular.

2. C. anglicana. English scurvy-grass, often but improperly employed for the former; with root-leaves ovate, entire, petioled; stem-leaves lanceolate, toothed, sessile silicles reticulate with veins.

3. C. danica; with all the leaves petioled, deltoid with three or five lobes; silicles elliptic, reticulate with veins.

4. C. armoracia. Horse-radish. Root-leaves lanceolate, crenate; stem-leaves cut and entire. A plant known to every one. This also is an article, and in many cases a valuable one, in the materia medica; for the medical properties of which however see RAPHANUS RUSTICANUS, its officinal name.

CO'CHLEARY. *a.* (from *cochlea*, Lat. a screw.) Screwform (*Brown*).

COCHLEATE LEGUME. In botany, a screw-shaped, or snail-shaped legume or pod. Turned like a screw, or the shell of a snail. As in medicago.

CO'CHLEATED. *a.* (from *cochlea*, Lat.) Of a screwed or turbinated form (*Woodward.*)

COCK. *s.* (cocc, Saxon.) 1. The male to the hen (*Dryden*). 2. The male of any small bird (*Arbuthnot*). 3. The weathercock, that shows the direction of the wind by turning (*Shaks.*). 4. The spout to let out water at will, by turning the top (*Pope*). 5. The notch of an arrow. 6. The part of the lock of a gun that strikes with the flint (*Grew*). 7. A conqueror; a leader (*Swift*). 8. Cock-crowing (*Shakspeare*). 9. A cockboat; a small boat (*Shakspeare*). 10. A small heap of hay (*Mortimer*). 11. The form of a hat (*Addison*). 12. The style of a dial (*Cham.*). 13. The needle of a balance. 14. *Cock on the hoop.* Triumphant; exulting (*Camden. Hudibras*).

COCK, in ornithology. See PHASIANUS.

To Cock. *v. a.* (from the noun.) 1. To set erect; to hold bolt upright (*Swift*). 2. To set up the hat with an air of petulance and pertness (*Prior*). 3. To mould the form of the hat. 4. To fix the cock of a gun for a discharge (*Dryd.*). 5. To raise hay in small heaps (*Spenser*).

To Cock. *v. n.* 1. To strut; to hold up the head (*Addison*). 2. To train or use fighting cocks (*Ben Jonson*).

COCKA'DE. *s.* (from *cock.*) A riband worn in the hat.

COCKATOO, in ornithology. See Psittacus.

CO'CKATRICE. *s.* (*cock*, and atτeɲ, Sax. a serpent) A serpent supposed to rise from a cock's egg.

CO'CKBOAT. *s.* (*cock* and *boat.*) A small boat belonging to a ship (*Stillingfleet*).

CO'CKBROTH. *s.* Broth made by boiling a cock (*Harvey*).

COCK-CHAFFER, in entomology. See Scarabæus.

COCKCRO'WING. *s.* The time at which cocks crow; early morning (*Mark*).

To CO'CKER. *v. a.* (*coqueliner*, Fr.) To cade; to fondle; to indulge (*Locke*).

Co'cker. *s.* (from *cock*). One who follows the sport of cockfighting.

Cocker, a river of England, which runs into the Derwent at Cockermouth.

COCKEREL, a young cock.

COCKERMOUTH, a populous borough in Cumberland, with a market on Mondays. Inhabitants about 3000. It has manufactures of shalloons, worsted stockings, and hats, and sends two members to parliament. Lat. 54. 42 N. Long. 3. 25 W.

CO'CKET. *s.* A seal belonging to the king's customhouse; likewise a scroll of parchment, sealed and delivered by the officers of the customhouse to merchants, as a warrant that their merchandise is entered.

COCK-FIGHTING. A cruel and most irrational sport, consisting in making cocks of a particular kind, and hence called game-cocks, fight together usually till the one or the other is killed. It is also a low sport, in consequence of the great number of subordinate persons that must necessarily be employed on the occasion as breeders, feeders, setters-to and assistants: and when the sport is conducted in high style, it is also, and on this very account, a sport as expensive as it is low and irrational. A cock-match consists of a certain number of cocks brought forward on two opposite sides and pitted, or entered for the cock-pit, one side against the other. The number of cocks having been shewn and weighed on each side, the match-bills containing their weights are compared; and all those which are either dead weights, or within an ounce of each other, are said to fall in, and are called main battles; in contra-distinction to those which do not come within the ounce of each other, and are thrown into the byes; which are generally fought for a trifling sum, and have no affinity whatever to the main. Should the cocks thus falling in constitute either a very small or an even number, it is usual to separate cocks of dead weights, or the nearest so, to match against others, (giving or taking an ounce in weight,) that the main may be extended in respect to the number of battles, and that number to be odd; thereby preventing, if possible, the mains from being left undecided; which, notwithstanding, sometimes happens unavoidably by the chance of a drawn battle.

That the match may be the better understood, let it be supposed that A stands engaged with B to shew twenty-one cocks on each side, ten guineas a battle, and fifty the main or odd battle. Of these fifteen fall into the main; and the remaining six are thrown into byes, and fight for two guineas a battle. It is in such case a custom to fight a part of the byes, both before and after such part of the main as is fought on each day, whether it is finished in one day, or is a long main of many days duration. The match being concluded, we find A has won nine main battles and two byes; B six main battles and four byes; when the winning and losing will stand precisely thus: A having three battles a-head in the main, is a winner of fifteen guineas upon the single battles; and winning the main also, he wins the twenty-five guineas upon that event; making himself the creditor for forty guineas: but in the byes, B having the advantage of four battles to two won by A, affords him a drawback of two guineas; and B is the loser of thirty-eight guineas battle-money upon the whole match; it being remembered, the byes were fought for only two guineas a battle; or, in other terms, a guinea each cock. And it will also be necessary for young adventurers to remember, that a match made for ten guineas a battle, is tantamount to five guineas each cock; and that fifty guineas, the odd of the main, is always understood a deposit (if required before fighting) of five-and-twenty guineas a side.

Cocks of middling size, and adequate powers, are always considered the sharpest and best fighters: in confirmation of which opinion, custom has established the match weights from three pounds six ounces to four pounds eight; none to be shewn and weighed in the main under the former, or above the latter, unless an extension to either a lower or a higher weight should be mutually acceded to. Sometimes (but very seldom) a short match, of a different kind, takes place, and is termed a shag-bag match, or battle; which is no more (the battle money having been previously agreed on) than turning the cock out at the bag's mouth in the pit, to meet his opponent, without ever having been brought to the scale, or the weight of his adversary ascertained.

In weighing the cocks, and making the match-bill, it is an invariable rule to begin with the lightest pair, who are to fight first, and so to continue according to their weight upwards; each successive pair being heavier than the former, so that the heaviest pair of cocks may fight last. Various sums being

betted upon a match or main soon after it is made, it may not be inapplicable to observe, that those who lay the odds in any proportion, as five to four, six to four, two to one, (or whatever other odds may be agreed upon) either in regard to the main or a single battle, is always entitled to the privilege of choosing his side, although it may not be mentioned; and this right he is possessed of in consequence of offering the odds.

The place appropriated to cockfighting is called COCKPIT; it is usually of an oblong or circular form, surrounded with seats, to which the spectators pay for admission; and in great mains, or subscription matches, the feeders generally agree with the masters of the match to receive the whole of this door money, which on other occasions is equally divided between them, as their compensation for the fortnight or three weeks they are engaged in feeding the cocks.

The cockpit royal is considered a sufficient sanction for the diversion of cock-fighting in every part of the kingdom. This is situate on the south side of St. James's Park, from which it has its entrance, and was erected in the reign of Charles the Second, who, having been himself fond of the sport, is said to have frequently honoured it with his presence, when matches were made and fought amongst his nobles. It is the only place where long mains, and great subscription matches, are fought in the metropolis; some of which are for considerable sums between opulent individuals, who procure their cocks from different parts of the country; and others, particularly the subscription matches, by many members on each side, who breed their cocks in distant counties, but fight them only in town; of which description various matches are annually fought during all the spring months, when cocks are in the finest feather and highest perfection.

This cockpit is circular, and completely surrounded with seats six tiers deep; exclusive of a rail, with standing room all round the summit of the uppermost seat; forming, in the whole, a perfect amphitheatre. The innermost circle upon which the cocks fight is a raised mound of earth, surrounded with boarding, about twenty feet in diameter, and should, according to the technical term of the sport, be covered with a fine green turf on this occasion denominated sod; in conformity with the general acceptation of the word in the sporting world, which by the sod implies cocking, and by the turf racing. In all mains or matches fought in the country parts of the kingdom, cocks invariably fight literally upon sod; but as this is an article difficult to be obtained in the metropolis, and which moreover would be inconvenient and inapplicable during hard frosty weather, when many matches are fought, matting upon the surface of the mound is substituted in its stead.

On each side this mound, and exactly opposite to each other, are placed two small seats for the setters-to; who retire to those seats during long fighting, or when ordered by their superiors and spectators so to do. Directly over the centre is suspended from the dome, by a chain, a very large circular branch, containing a great number of candles, affording a profusion of light; for nearly all the matches fought here are very unnaturally decided by night, the company going to pit at six o'clock in the evening. Whence the word cockpit in a ship, or lowermost deck only lighted by candles.

At the hour previously agreed on, the bags containing the cocks are brought into the pit by the feeders, or whomsoever may be appointed: they are there received by persons called the setters-to, whose qualifications depend upon a quick eye, a light hand, and agile heel; without the whole of which, celebrity can never be acquired in their way. The cocks being taken from the bags, are most scrupulously compared in feather and marks with the original description entered in the match-bill on the day of weighing; and if there should prove the most trifling deviation, a mistake wilful or accidental is supposed to have taken place, and no progress whatever is made in fighting, till the mistake be completely rectified. This ceremony adjusted, the feeders retire from the centre of the pit, and become mere spectators; the setters-to being left in sole possession with the cocks in hand. In this state they are shewn to each other beak to beak; and if they show fight, they are, for form's sake in the first battle only, given into the hands of the makers (called masters) of the match, who are situate in the lowest circular seat opposite to each other, and they giving the cocks a set-to toss upon the mat, the battle begins amidst clamours indescribable.

Bettings instantly take place of every kind, as well upon the battle fighting, as upon the main (meaning the odd battle) of the first three, the first five, &c. Bets made upon the long main, imply the winner of the match at its termination, as distinguished from betting upon the main of three, of five, or of seven battles which are very frequently made.

There are certains rules and customs to be observed in fighting; the most material of which it is necessary to explain. When once the cocks are pitted, neither of the setters-to have the privilege to touch or handle his cock, so long as they continue to fight, unless their weapons hang in the mat, they are entangled with each other, are got too close to the edge of the pit, or have left off fighting while the umpire or law-teller can count forty; in either of these cases, each setter-to instantly handles his cock, bringing them beak to beak in the middle of the pit: if one cock have refused to fight while the telling forty took place, his adversary, who made the last fight, with either heel or beak, is said to have the first law in his favour. When brought beak to beak, and set on their legs, if the cock who did not fight while the forty was telling continues to decline fighting, the setter-to of his adversary (or umpire, if there be one) proceeds to tell

ten; which being done, they are again handed, and brought beak to beak; if the same cock continue still unwilling or unable to fight, the ceremony of telling ten, and bringing beak to beak, at the conclusion of every ten, takes place, till it has been repeated ten different times, when the cock so refusing to fight has lost his battle. But should he fight during the enforcement of any part of the law, even in telling the last ten, what has been told is of no effect, and the first ten must be begun again, whenever a fight is renewed. Instances sometimes happen, when the cock who has the long law in his favour retreats from the cock seemingly beaten, and in his turn has the law going on against him; so that the cock who fights last has the law in his favour, till one side or other is counted out.

If, during a battle (either by long fighting or a cut down blow), any person offers to bet ten pounds to a crown, or throws his hat, glove, or handkerchief, into the pit, which is the same thing, and so understood, though not a word is spoken, the teller immediately begins to tell forty in a deliberate manner, which being done, he proclaims, "Ten pounds to a crown is betted; will any body take it? will any body take it?" No reply being made, the battle is won by the cock upon whom the odds were offered. On the contrary, should the bet be accepted in words, or a handkerchief, hat, or glove, be thrown into the pit, during the time of so telling the forty, it is an acceptance of the ten pounds to a crown offered, and the cocks are instantly handed beak to beak in consequence. If a cock, having the law in his favour, dies before the long law is told out, his adversary wins the battle, although he did not fight within the law; for there cannot be a greater criterion of victory than having killed his opponent.

CO'CKHORSE. *a.* (*cock* and *horse.*) On horseback; triumphant; exulting (*Prior*).

CO'CKLE. *s.* (coccel, Saxon.) A weed that grows in corn; a species of poppy (*Donne*).

Cockle. In helminthology. See Cardium.

Cockle. In oryctology, the provincial name for schorl. See Scorlus.

Cockle-stairs. *s.* Winding or spiral stairs.

To Cockle. *v. a.* To contract into wrinkles, like the shell of a cockle (*Gay*).

CO'CKLED. *a.* (from *cockle.*) Shelled, or turbinated (*Shakspeare*).

CO'CKLOFT. *s.* (*cock* and *loft.*) The room over the garret (*Dryden*).

CO'CKMASTER. *s.* One that breeds game-cocks (*L'Estrange*).

CO'CKMATCH. *s.* Cockfight for a prize.

CO'CKNEY. *s.* A very ancient nickname for a citizen of London. Ray says, an interpretation of it is, A young person coaxed or coquered, made a wanton, or nestle-cock, delicately bred and brought up, so as when arrived at man's estate to be unable to bear the least hardship. Another, A person ignorant of the terms of the country œconomy, such as a young citizen, who having been ridiculed for calling the neighing of a horse laughing, and told that it was called neighing, next morning, on hearing the cock crow, to show that instruction was not thrown away upon him, exclaimed to his former instructor, "How that cock neighs!" whence the citizens of London have ever since been called cock-neighs, or cockneys. Whatever may be the origin of this term, we at least learn from the following verses, attributed to Hugh Bagot, earl of Norfolk, that it was in use in the time of king Henry II.

Was I in my castle at Bungay,
Fast by the river Waveney,
I would not care for the king of cockney.
(*i. e.* the king of London).

The king of the cockney occurs among the regulations for the sports and shows formerly held in the Middle Temple, on Childermas day, where he had his officers, a marshal, constable, butler, &c. See Dugdale's Origines Juridiciales, p. 247.

CO'CKPIT. *s.* (*cock* and *pit.*) 1. The area where cocks fight. See the article Cock-fighting. (*Howel*). 2. A place on the lower deck of a man of war.

COCK-ROACH, in entomology. See Blatta.

Cock's-comb, in botany. See Celosia and Pedicularis.

Cock's-comb (Yellow). See Rinanthus.

Cock's-foot-grass. See Dactylis.

Cock's-head, in botany. See Hedysarum.

CO'CKSHUT. *s.* The close of the evening.

CO'CKSPUR. *s.* Virginian hawthorn. A species of medlar (*Miller*).

CO'CKSURE. *ad.* Confidently certain; without fear or diffidence (*Shakspeare*).

CO'CKSWAIN. *s.* (coȝȝrpaine, Sax.) The officer that has the command of the cockboat.

CO'CKWEED. *s.* A plant; pepperwort.

COCOA-NUT. In botany. See Cocos.

Cocoa-plumb. See Chrysobalanus.

COCONATO, a town of Piedmont, in Italy, famous for being the birth-place of Columbus. Lat. 45. 5 N. Lon. 8. 9 E.

COCOON. See Silk.

COCOS. In botany, a genus of the class monoecia, order hexandria. Calyx three-parted; corol three-petalled; stigmas three; drupe coriaceous. Five species; tropics, East Indies and South America.

1. C. nucifera. Cocoa-nut-tree. Unarmed; fronds pinnate; leaflets folded back, sword-shaped. This tree rises to the height of sixty feet, and is slenderer in the middle than towards the top or bottom. The leaves or branches are often fourteen or fifteen feet long, and twenty-eight in number, winged, of a yellow colour, straight and tapering. The pinnæ are green, often three feet long next the trunk, but diminishing in length towards the extremity of the branches, which are fastened at top by brown filamentous threads that grow out of them, of the size of ordinary pack-

thread, and are interwoven like a web. The nuts hang at the summit of the trunk in clusters of a dozen each. The incrusted white-meat of the nut is formed of the interior fluid, which is continually concreting as it ascends from the root. The interior fluid, or milk, as it is called, is often upwards of a pint. The leaves are wrought into brooms, mats, sacks, hammocks, and other utensils. In its original climate this tree was probably an Asiatic plant; but it is now found in almost all the warm parts of America. It may be propagated in our own country from the ripe nut, which should be kept in large pots of sand during the voyage; and if it should shoot in the course of the passage it will be so much time gained. But the nuts brought to England for sale will seldom answer for the purpose of propagation, as they are almost always plucked before they are ripe, that they may the more safely endure the voyage.

2. C. butyracea. Palm-oil-tree. A native also of South America; unarmed; fronds pinnate; leaflets simple. It is from this species that we obtain the palm-oil of the dispensatories: for a farther account of which, see PALM-OIL.

3. C. Guineensis. Prickly-pole. A native of Carthagena: the entire tree covered with subulate spines; fronds distant, root creeping.

4. C. aculeata. Macow-tree. A native of the Caribees; sharp, prickly; trunk fusiform; fronds pinnate; stipes and spathes spinous.

5. C. nypa. An East Indian tree: unarmed; fronds pinnate; spadix of the male flowers round, of the females roundish; drupe grooved.

CO'CTILE. *a.* (*coctilis*, Latin.) Made by baking.

CO'CTION. *s.* (*coctio*, Latin.) The act of boiling (*Arbuthnot*).

COCYTUS, a river of Epirus, derived from κωκυειν, to weep and to lament. Its etymology, the unwholesomeness of its water, and above all, its vicinity to the Acheron, have made the poets call it one of the rivers of hell. (*Virg.*)

COD, in ichthyology. See GADUS.

COD. *s.* (coꝺꝺe, Saxon.) Any case or husk in which seeds are lodged (*Mortimer*).

To COD. *v. a.* (from the noun.) To enclose in a cod (*Mortimer*).

COD-FISHERY. See FISHERY.

CODA, in music, a small number of bars, or measures, at the end of a canon, or fugue, which repeated several times serve to end the piece.

CODAGA-PALA, in medicine. See CONESSI CORTEX.

CO'DDERS. *s.* (from *cod.*) Gatherers of peas.

CODDAM-PULLI. See CAMBOGIA.

CODDY-MODDY, in ornithology, a species of gull: the larus hybernus of Gmelin.

CODE, CODEX, a collection of the laws and constitutions of the Roman emperors; made by order of Justinian.

The word comes from the Latin *codex*, a paper book; so called *à codicibus*, or *cordicibus arborum*, the trunks of trees; the bark whereof, being stripped off, served the ancients to write their books on.

The code is comprised in twelve books, and makes the second part of the civil or Roman law.

There were several other codes before the time of Justinian; all of them collections or abridgments of the Roman laws. Gregorius and Hermogenes, two lawyers, made each a collection of this kind, called, from their names, the Gregorian code, and Hermogenean code. The former included the constitutions of the emperors from Adrian, or, as some say, of Augustus, to Dioclesian and Maximian. The latter was compiled in the age of the Constantines, and comprised all the imperial constitutions of Dioclesian and Maximian, besides those of Claudius, Aurelian, Probus, Caius, and Caginus, to the year 306 or 312. We have nothing remaining of them but a few fragments; the compilations themselves falling to the ground, for want of authority to put them in execution. The emperor Justinian, finding the authority of the Roman law exceedingly weakened in the west, upon the decline of the empire, made a general collection of the whole Roman jurisprudence. The management hereof he committed to his chancellor Trebonianus; who chose out the most excellent constitutions of the emperors, from Adrian to his own time; and published his work in 529, under the title of the New Code.

But because Justinian had made several new decisions, which made some alteration in the ancient jurisprudence, he retrenched some of the constitutions inserted by Trebonianus, and added his own in their place: on which account he published a new edition of the code in 534, and abrogated the former. See CIVIL LAW.

There have been various other later codes, particularly of the ancient Gothic, and since of the French kings; as the Code of Frederic, the Code Michault, Code Louis, Code Neron, Code Henry, Code Marchand, Code des Eaux, Code Noire, &c.

CODE (Military), rules and regulations for the good order and discipline of an army. Of this description are the articles of war.

CODEX, in antiquity, a kind of punishment by means of a clog, or block of wood, to which slaves, who had offended, were tied fast, and obliged to drag it along with them; and sometimes they sat on it closely bound.

CODIA. In botany, a genus of the class octandria, order digynia. Calyx four-leaved; corol four-petalled; common receptacle involucred, involucre four-leaved. One species only; a native of New Caledonia.

CODICIL, a schedule, or supplement to a will, or other writing. It is used as an addition to a testament, when any thing is omitted which the testator would add, explain, alter, or retract; and is of the same nature as a testament, except that it is without an heir, or executor,

So that a codicil is a less solemn will, of one that dies either testate or intestate, without the appointment of an heir; testate, when he that hath made his codicil hath either before or afterwards made his testament, on which that codicil depends, or to which it refers: intestate, when one leaves behind him only a codicil without a testament, wherein he gives legacies only to be paid by the heir at law, and not by any heir instituted by will or testament. A codicil, as well as a will, may be either written or nuncupative. Some authors call a testament a great will; and a codicil a little one. But there is this further difference between a codicil and a testament, that a codicil cannot contain the institution of an heir; and that in a codicil, a man is not obliged to observe strictly all the formalities prescribed by law for solemn testaments.

CODI'LLE. *s.* (*codille*, French.) A term at ombre.

To CO'DLE. *v. a.* (*coctulo*, Latin.) To parboil.

CO'DLING. *s.* (from *to codle.*) An apple generally codled (*King*). See PYRUS.

CODLINGS and CREAM, in botany. See EPILOBIUM.

CODON, in antiquity, a little brass bell; often fastened to the bridles and trappings of horses.

CODON, in botany, a genus of the class decandria, order monogynia. Calyx ten-parted; corol campanulate, ten-cleft; capsule many-seeded. One species only; an herbaceous plant rising about two feet high, indigenous to the Cape.

CODRINGTON (Christopher), a liberal encourager of learning and religion. He was born at Barbadoes, in 1668; and brought up first at Christ church, Oxford, but afterwards obtained a fellowship at All Souls. On leaving the university, he entered into the army, but without resigning the fellowship; and having distinguished himself bravely in the West Indies, he was made captain-general of the Leeward islands. He died at Barbadoes in 1701; and in 1716 his remains were brought to England, and deposited in the chapel of All Souls, to which college he had bequeathed his books, worth 6000l. and 10,000l. besides. His estates in the West Indies he left to the society for propagating the gospel in foreign parts. He wrote four poems in the Musæ Anglicanæ.

CODRUS. The most celebrated of this name is the 17th, and last king of Athens, son of Melanthus. When the Heraclidæ made war against Athens, the oracle said, that the victory would be granted to that nation whose king was killed in battle. The Heraclidæ upon this gave strict orders to spare the life of Codrus; but the patriotic king disguised himself, and attacked one of the enemy, by whom he was killed. The Athenians obtained the victory, and Codrus was deservedly called the father of his country. He reigned 22 years, and was killed 1070 years before the Christian æra. To pay more honour to his memory, the Athenians made a resolution, that no man after Codrus should reign in Athens under the name of king, and therefore the government was put into the hands of perpetual archons.

CŒCUM, in anatomy, the first portion of the large intestine, in which the small intestine ends. As its dimensions exceed those of the rest of the canal, it is also known by the name of caput coli. See INTESTINES.

COE'FFICACY. *s.* (*con* and *efficacia*, Lat.) The power of several things acting together to produce an effect (*Brown*).

COEFFI'CIENCY. *s.* (*con* and *efficio*, Latin.) Co-operation; the state of acting together to some single end (*Glanville*).

COEFFI'CIENT. *s.* (*con* and *efficiens*, Latin.) That which unites its action with the action of another.

COEFFICIENTS, in algebra, such numbers, or known quantities, as are put before letters or quantities, whether known, or unknown, and into which they are supposed to be multiplied. Thus, in $3x$, $2by$, $4z^2$, $8ax^3$; 3, $2b$, 4, and $8a$, are the co-efficients of x, y, z^2, and x^3. If a quantity have no number or letter prefixed, it is to be understood that one is the co-efficient. There are certain relations between the roots of equations and the co-efficients of their terms, for which see EQUATIONS.

COEFFICIENTS *of the same order*, are such as are prefixed to the same unknown quantities in different equations.

COEFFICIENTS (Opposite), such as are taken each from a different equation, and from a different order of co-efficients.

CŒLESTIAL OBSERVATIONS, are observations of the phenomena of the heavenly bodies, made with a proper apparatus of astronomical instruments, in order to determine their places, motions, phases, &c. The instruments chiefly used in cœlestial observations are the astronomical gnomon, quadrant, micrometer, and telescope.

CŒLESTIAL GLOBE. See GLOBES.

CŒLESTINE. See SULFAT OF STRONTIAN.

CŒLIAC ARTERY, (*cœliacus*, belonging to the belly; from κοιλια, the belly.) Arteria cœliaca. The first branch given off from the aorta in the cavity of the abdomen. It sends branches to the diaphragm, stomach, liver, pylorus, duodenum, omentum, and spleen.

CŒLIAC PASSION. A species of diarrhœa. See DIARRHŒA.

CŒLIUS MONS, one of the seven mountains or hills of the city of Rome, which owes its name to Cœlius or Cœles, a famous Tuscan general, who pitched his tents there when he came to the assistance of Romulus against the Sabines.

CŒLOSTOMIA, (κοιλοστωμια, from κοιλος, hollow, and στωμα, the mouth.) Sepulchral voice. A defect in speaking, when the voice sounds unusually hollow, or as if it proceeded from a cavern.

CŒLUM. See HEAVEN.

CŒLUS, or URANUS, an ancient deity,

supposed to be the father of Saturn, Oceanus, Hyperion, &c. He was the son of Terra, whom he afterwards married. The number of his children, according to some, amounted to forty-five. They were called Titans, and were so closely confined by their father, that they conspired against him, and were supported by their mother, who provided them with a scythe. Saturn armed himself with this scythe, and deprived his father of the organs of generation, as he was going to unite himself to Terra. From the blood which issued from the wound sprang the giants, furies, and nymphs. The mutilated parts were thrown into the sea, and from them, and the foam which they occasioned, arose Venus the goddess of beauty. (*Hesiod.* &c.).

CŒMETERIUM. See CEMETERY.

COE'MPTION. *s.* (*coemptio*, Latin.) The act of buying up the whole quantity of any thing (*Bacon*).

CŒNOBITE, a religious who lives in a convent, or in community, under a certain rule; in opposition to an anchoret or hermit, who lives in solitude. The word comes from the Greek κοινος, *communis*; and βιος, *vita*, life. Cassian makes this difference between a convent and a monastery, that the latter may be applied to the residence of a single religious or recluse; whereas the convent implies cœnobites, or numbers of religious living in common.

CŒNOBIUM, κοινοβιον, the state of living in a society, or community, where all things are common.

CŒNOTAPH. See CENOTAPH.

CŒNUM. In medicine, (κοινον, from κοινος, common, filthy.) Suburra; filth, excrement of any kind.

COE'QUAL. *a.* (from *con* and *equalis*, Lat.) Equal (*Shakspeare*).

COEQUA'LITY. *s.* (from *coequal.*) The state of being equal.

To COE'RCE. *v. a.* (*coerceo*, Latin.) To restrain; to keep in order by force (*Ayliffe*).

COE'RCIBLE. *a.* (from *coerce.*) 1. That may be restrained. 2. That ought to be restrained.

COE'RCION. *s.* (from *coerce.*) Penal restraint; check (*South*).

COE'RCIVE. *a.* (from *coerce.*) 1. That has the power of laying restraint (*Blackmore*). 2. That has the authority of restraining by punishment (*Hooker*).

COESFELDT, a town of Westphalia, in Germany, 22 miles S. W. of Munster. Lat. 51. 48 N. Lon. 7. 30 E.

COESSE'NTIAL. *a.* (*con* and *essentia*, Latin.) Participating of the same essence (*Hooker*).

COESSENTIA'LITY. *s.* (from *coessential.*) Participation of the same essence.

COETA'NEOUS. *a.* (*con* and *ætas*, Latin.) Of the same age with another (*Brown*).

COETE'RNAL. *a.* (*con* and *æternus*, Lat.) Equally eternal with another (*Milton*).

COETE'RNALLY. *ad.* In a state of equal eternity with another (*Hooker*).

COETE'RNITY. *s.* (from *coeternal.*) Existence from eternity equal with another eternal being (*Hammond*).

COE'VAL, COE'VOUS. *a.* (*coævus*, Latin.) Of the same age (*Prior. South*).

COE'VAL. *s.* (from the adjective.) A contemporary (*Pope*).

COEVORDEN, one of the strongest towns of Overyssel, in the United Provinces, 30 miles S. of Groningen. Lat. 52. 44 N. Lon. 6. 44 E.

To COEXI'ST. *v. n.* (*con* and *existo*, Latin.) To exist at the same time (*Hale*).

COEXI'STENCE. *s.* (from *coexist.*) Existence at the same time with another (*Grew*).

COEXI'STENT. *a.* Having existence at the same time with another (*Locke*).

To COEXTE'ND. *v. a.* (*con* and *extendo*, Latin.) To extend to the same space or duration with another (*Grew*).

COEXTE'NSION. *s.* (from *coextend.*) The act or state of extending to the same space or duration with another (*Hale*).

CO'FFEA. (from קפאוה, *kophuah*, a mixture of different ingredients, so called from the pleasant potation which is made from its berry.) Coffee-tree, in botany, a genus of the class pentandria, order monogynia. Corol salver-shaped; stamens inserted above the tube; berry inferior, mostly two-seeded; seeds arillate. Ten species: chiefly of the East Indies, South America, and the Polynesian isles.

The only species we have space to notice is the coffea Arabica, of which there are two varieties, though both are sold in our shops as Turkey coffee, and possess similar qualities.

α. With leaves oblong-ovate; flowers in axillary clusters; corols five-cleft.

β. With berries oblong, acute at the base; leaves opposite and waved; flowers from two to four together, nearly sessile, white, odorous.

The tree seldom rises more than sixteen or eighteen feet high, with an erect main stem, covered with a lightish brown bark: the leaves are oblong-ovate, pointed; flowers in axillary clusters, the corols of which are five-cleft. These flowers are of a pure white, and very pleasant odour, but their duration is very transient. The fruit resembles a cherry; and grows in clusters, ranged along the branches under the axillæ of the leaves, which are of a laurel hue, but rather longer than the laurel leaf. It is an ever-green, and makes a beautiful appearance at every season in the stove, but particularly when it is in flower. The coffee-tree is now propagated in great plenty in many parts of America; but the produce of these countries is greatly inferior to that of Arabia. This plant is propagated by seeds, which should be sown soon after they are gathered from the tree, for if kept but a short time out of the ground, they will not grow, which is the chief reason that this tree has not been spread into more different countries; for the seeds will not keep long enough to be sent into any place; so that in order to cultivate this plant in any part of the world, it is absolutely necessary to have

it carried thither growing. The berries are commonly ripe with us in April, at which time they should be sown in pots of fresh light earth, covering them about half an inch thick with the same light earth; then plunge the pots into a moderate hot-bed of tanner's bark, observing to refresh them often with water, as also to raise the glasses in the heat of the day, to admit fresh air; and in very hot weather, it will be proper to shade the glasses with mats, otherwise the earth in the pots will dry too fast, and prevent the vegetation of the seeds. It must be observed, that the taking off the pulp of the berries, which has been by some people directed as absolutely necessary, is a great mistake. When this plant is removed, great care should be taken not to break or injure the roots, and also to preserve the earth to the roots; nor should they be kept any time out of the ground, for if their fibres be suffered to dry, they are very subject to mould, and perish soon after. The soil in which this tree has been observed to thrive best was composed in the following manner, viz. one load of fresh, light, loamy earth; one load of rotten cow dung, with half a load of sea sand: these were well mixed together, and laid in a heap six months before it was used, in which space it was turned several times, the better to incorporate the several parts.

The coffee-tree has of late years been much cultivated in the islands of America, both by the English and French, but the coffee which has been thence brought to Europe has been very little esteemed. This great difference in the goodness many have attributed to the soil in which it grows, and therefore have supposed it impossible for the inhabitants of the British islands ever to cultivate this commodity to any real advantage; but this is certainly a mistake, as is affirmed by several persons of credit, who have resided in these islands, who say, that the berries which they have gathered from the trees and roasted themselves, were as well flavoured as any of the coffee which is brought from Mocha; so that the fault is in the drying, packing, and bringing over; for if in the drying of the berries they be laid in rooms near the sugar-works, or near the house where the rum is distilled, the berries will soon imbibe the surrounding effluvia, which will greatly alter their flavour. In like manner the coffee brought in the same ships with rum and sugar, were the coffee ever so good, would hereby be entirely altered.

With respect to the medicinal properties of coffee, it is in general excitant and stimulating; though we doubt whether it relaxes the animal fibres, as has by some authors been supposed. Its more or less wholesome effect greatly depends on the climate, as well as the age, constitution, and other peculiarities, of the individual. Hence it cannot be recommended to children, or persons of a hot, choleric, nervous, or phthisical habit; nor will it be so safe and useful in warm as in cold and temperate climates; but to the phlegmatic and sedentary, a cup of coffee, one or two hours after a meal, or, which is still better, one hour before it, may be of service to promote digestion, and prevent or remove a propensity to sleep. In cases of spasmodic asthma, hypochondriasis, scrofula, diarrhœa, agues, and particularly against narcotic poisons, such as opium, hemlock, &c. coffee often produces the best effects: nor is there a domestic remedy better adapted to relieve periodical headachs which proceed from want of tone, or from debility of the stomach.

CO'FFEEHOUSE. *s.* (*coffee* and *house.*) A house where coffee is sold (*Prior*).

CO'FFEEMAN. *s.* One that keeps a coffee-house (*Addison*).

CO'FFEEPOT. *s.* The covered pot in which coffee is boiled.

COFFEE-TREE. See COFFEA.

CO'FFER. *s.* (coꝼꝼne, Saxon.) 1. A chest generally for keeping money (*Spenser*). 2. Treasure (*Bacon*). 3. (In fortification.) A hollow lodgment across a dry moat (*Chambers*).

To CO'FFER. *v. a.* To treasure up in chests (*Bacon*).

COFFER, in architecture, a square depressure or sinking in each interval between the modillions of the Corinthian cornice; ordinarily filled up with a rose; sometimes with a pomegranate, or other enrichment.

COFFERDAM. See BATTERDEAU.

COFFERER *of the King's Houshold*, a principal officer in the court, next under the comptroller, who, in the counting-house, and elsewhere at other times, has a special charge and oversight of the other officers of the house, for their good demeanor and charge in their offices, to all which he pays their wages.

COFFIN, the chest in which a dead body is usually put for interment. The sepulchral honours paid to departed friends in ancient times are extremely curious. Their being put into a coffin was with them considered as a mark of the highest distinction; though with us the poorest people have their coffins. At this day, in the east, they are not at all made use of; and Turks and Christians, as Thevenot assures us, agree in this. The ancient Jews seem to have buried their dead in the same manner: neither was the body of Christ, it should seem, put into a coffin; nor that of Elisha (2 Kings xiii. 21.) whose bones were touched by the corpse that was let down a little after into his sepulchre. However, that coffins were anciently made use of in Egypt all agree; since antique coffins of stone and sycamore wood are still to be seen in that country; not to mention those said to be made of a kind of pasteboard, formed by folding or glueing cloth together a great many times, curiously plastered, and then painted with hieroglyphics. Its being an ancient Egyptian custom, and not practised in the neighbouring countries, was, doubtless, the cause that the sacred historian expressly observes of Joseph, that he was not only embalmed, but put into a coffin too; both being customs that were peculiar to the Egyptians.

We have, among other ingenious inventions, patent coffins, which effectually preclude the depredations of that abominable crew, that ob-

tain a livelihood by robbing cemeteries. The security of this contrivance arises chiefly from making the coffin so very strong, as to resist the instruments usually employed by what are termed resurrection-men, and by making the lid to fit on with spring plugs, fitting into hitched sockets; so that being once closed, they never can be severed, except by breaking the coffin to pieces. It is to be lamented that such practices are considered to be at all necessary under the plea of the bodies being subjects for dissection, and considerably aiding to anatomical and pathological research. Were all who suffer under the sentence of the law to be devoted to that purpose, many good effects might arise, and the obnoxious resource, now referred to, be discontinued. Our ancestors generally used stone coffins. The nations of Asia, Africa, and America, as well as the Turks in general, do not use any case for the interment of their dead. It is, however, to be remembered, that the shroud used by the Musselmans, both in Europe and throughout Asia, is called kauffin; whence we may be led to conjecture that to have been the origin of our designation.

Many of our readers will, probably, remember that the late emperor of Germany, Joseph II. about the year 1781, enacted a law, by which the interment of dead bodies in coffins was prohibited; nay, it was ordered that they should be buried in bags, and covered with quick-lime, in order to promote their putrefaction, and prevent the exhalation of noxious vapours. This severe regulation, however, met with so universal and decided an opposition, that the enlightened monarch, from prudential motives, was speedily induced to repeal it.

Coffin-bone, in a horse, is that which lies within the hoof, as in a coffin. It is round upwards, where it receives the little pastern, but grows broader and thinner towards its bottom; it is of a porous open texture, like a piece of loaf-sugar, and is easily pierced, and often wounded when horses happen to take up nails or other sharp things upon the road.

Coffin-joint, is that which connects the pastern with the foot. See the articles Pastern and Foot.

To Co'ffin. *v. a.* To enclose in a coffin (*Donne*).

CO'FFINMAKER *s.* One whose trade is to make coffins (*Tatler*).

To COG. *v. a.* 1. To flatter; to wheedle (*Shakspeare*). 2. *To* Cog *a die.* To secure it, so as to direct its fall; to falsify (*Swift*). 3. To obtrude by falsehood (*Tillotson*).

To Cog. *v. n.* To lie; to wheedle (*Shakspeare*).

Cog. *s.* The tooth of a wheel, by which it acts upon another wheel.

To Cog. *v. a.* To fix cogs in a wheel.

CO'GENCY. *s.* (from *cogent.*) Force; strength; power of compelling; conviction (*Locke*).

CO'GENT. *a.* (*cogens*, Latin.) Forcible; resistless; convincing; powerful (*Bentley*).

CO'GENTLY. *ad.* With resistless force; forcibly; so as to force conviction (*Locke*).

CO'GGER. *s.* (from *To cog.*) A flatterer; a wheedler.

COGGESHALL, a town of Essex, with a market on Saturdays. Lat. 51. 52 N. Lon. 0. 47 E.

Coggeshall's sliding rule. See Sliding rule.

COGGLE, a small fishing boat upon the Yorkshire coast. Cogs (cogones) are a kind of little ships or vessels used in the rivers Ouse and Humber.

CO'GGLESTONE. *s.* (*cuogolo*, Ital.) A little stone; a small pebble (*Skinner*).

CO'GITABLE. *a.* (from *cogito*, Latin.) What may be the subject of thought.

To CO'GITATE. *v. n.* (*cogito*, Latin.) To think; to exercise the mind.

COGITA'TION. *s.* (*cogitatio*, Latin.) 1. Thought; the act of thinking (*Hooker*). 2. Purpose; reflection previous to action. 3. Meditation; contemplation (*Milton*).

CO'GITATIVE. *a.* (from *cogito*, Latin.) 1. Having the power of thought (*Bentley*). 2. Given to deep meditation (*Wotton*).

COGNAC, a town of France, in the department of Charente, and late province of Angoumois. It is noted for excellent brandy. Lat. 45. 44 N. Lon. 0. 10 W.

COGNA'TION. *s.* (*cognatio*, Latin.) 1. Kindred (*South*). 2. Relation; participation of the same nature (*Brown*).

COGNI, the ancient Iconium, a strong town of Caramania, in Turkey. Lat. 37. 55 N. Lon. 35. 56 E.

COGNISE'E. *s.* (In law.) He to whom a fine in lands or tenements is acknowledged (*Cowell*).

CO'GNISOUR. *s.* (In law.) He that passes or acknowledges a fine to another (*Cowell*).

COGNI'TION, *s.* (*cognitio*, Latin.) Knowledge; complete conviction (*Brown*).

CO'GNITIVE. *a.* (from *cognitus*, Latin.) Having the power of knowing (*South*).

CO'GNIZABLE. *a.* (*cognoisable*, French.) 1. That falls under judicial notice. 2. Liable to be tried, or examined (*Ayliffe*).

COGNIZANCE, or Connusance, in law, has various significations; sometimes it is an acknowledgment of a fine, or confession of something done; sometimes the hearing of a matter judicially, as to take cognizance of a cause, and sometimes a particular jurisdiction, as cognizance of pleas, is an authority to call a cause or plea out of another court, which no person can do but the king, except he can shew a charter for it.

COGNO'MINAL. *a.* (*cognomen*, Latin.) Having the same name (*Brown*).

COGNOMINA'TION. *s.* (*cognomen*, Lat.) 1. A surname; the name of a family. 2. A name added from any accident or quality (*Brown*).

COGNO'SCENCE. *s.* (*cognosco*, Latin.) Knowledge; the state or act of knowing.

COGNO'SCIBLE. *a.* (*cognosco*, Latin.) That may be known (*Hale*).

COGNOVIT ACTIONEM, in law, is where a defendant acknowledges or confesses the plaintiff's cause against him to be just and true; and after issue, suffers judgment to be entered against him without trial. But most frequently the defendant confesses one part of the complaint, and traverses or denies the rest.

COHABITA'TION. *s.* (from *cohabit.*) 1. The act or state of inhabiting the same place with another. 2. The state of living together as married persons (*Tatler*).

COHE'IR. *s.* (*cohæres*, Lat.) One of several among whom an inheritance is divided (*Taylor*).

COHE'IRESS. *s.* A woman who has an equal share of an inheritance with other women.

To COHE'RE. *v. n.* (*cohæreo*, Latin.) 1. To stick together (*Woodward*). 2. To be well connected. 3. To suit; to fit (*Shakspeare*). 4. To agree

COHE'RENCE, COHE'RENCY. *s.* (*cohærentia*, Latin.) 1. That state of bodies in which their parts are joined together, so that they resist divulsion and separation (*Quincy. Bentley*). 2. Connexion; dependency; the relation of parts or things one to another (*Hooker*). 3. The texture of a discoure. 4. Consistency in reasoning, or relating (*Locke*).

COHE'RENT. *a.* (*cohærens*, Latin.) 1. Sticking together (*Arbuthnot*). 2. Connected; united (*Locke*). 3. Suitable to something else; regularly adapted (*Shakspeare*). 4. Consistent; not contradictory (*Watts*).

COHE'SION. *s.* (from *cohere.*) 1. The act of sticking together (*Newton*). 2. The state of union (*Blackmore*). 3. Connexion; dependence (*Locke*).

COHESION, in natural philosophy, as distinguished from adhesion, is that species of attraction which, uniting particle to particle, retains together the component parts of the same mass. See MOLECULAR ATTRACTION.

Whatever the cause of cohesion may be, its effects are evident and certain. The different degrees of it constitute bodies of different forms and properties. Thus, Newton observes, the particles of fluids which do not cohere too strongly, and are small enough to render them susceptible of those agitations which keep liquors in a fluid state, are most easily separated and rarefied into vapour, and make what the chemists call volatile bodies; being rarefied with an easy heat, and again condensed with a moderate cold. Those that have grosser particles, and so are less susceptible of agitation, or cohere by a stronger attraction, are not separable without a greater degree of heat; and some of them not without decomposition.

Modern chemists have agreed to consider the attraction of cohesion as the instrument of aggregation, or the union of similar compounds, and are careful not to confound it with the elective attractions, though there may, in strictness, be no difference between them.

In estimating the absolute cohesion of solid pieces of bodies, Muschenbroek applied weights to separate them according to their length: his pieces of wood were long square parallelopipedons, each side of which was .26 of an inch, and they were drawn asunder by the following weights:

	lb.
Fir	600
Elm	950
Alder	1000
Linden tree	1000
Oak	1150
Beech	1250
Ash	1250

He tried also wires of metal, 1-10th of a Rhinland inch in diameter: the metals and weights are as follow:

	lb.
Of Lead	$29\frac{1}{4}$
Tin	$40\frac{1}{4}$
Copper	$299\frac{1}{4}$
Yellow brass	360
Silver	370
Iron	450
Gold	500

He then tried the relative cohesion, or the force with which bodies resist an action applied to them in a direction perpendicular to their length. For this purpose he fixed pieces of wood by one end into a square hole in a metal plate, and hung weights towards the other end till they broke at the hole: the weights and distances from the hole are exhibited in the following table:

	Distance. *inc.*	Weight. *oz.*
Pine	$9\frac{1}{2}$	$36\frac{1}{2}$
Fir	9	40
Beech	7	$56\frac{1}{2}$
Elm	9	44
Oak	$8\frac{1}{2}$	48
Alder	$9\frac{1}{4}$	48

In the following table the numbers denote the pounds avoirdupois which are just sufficient to tear asunder a rod of each of the bodies, whose base is an inch square.

I. METALS.	
Steel, bar	135,000
Iron, bar	74,500
Iron, cast	50,100
Copper, cast	28,600
Silver, cast	41,500
Gold, cast	22,000
Tin, cast	4,440
Bismuth	2,900
Zinc	2,600
Antimony	1,000
Lead, cast	860
II. WOODS.	
Locust-tree	20,100
Jujeb	18,500
Beech, oak	17,300
Orange	15,500
Alder	13,900

Elm	13,200
Mulberry	12,500
Willow	12,500
Ash	12,000
Plum	11,800
Elder	10,000
Pomegranate	9,750
Lemon	9,250
Tamarind	8,750
Fir	8,330
Walnut	8,130
Pitch-pine	7,656
Quince	6,750
Cypress	6,000
Poplar	5,500
Cedar	4,880

The direct cohesive strength of a body is in the joint ratio of its primitive elasticity, of its toughness, and the magnitude of its section.

Coulomb found the lateral cohesion of brick and stone only $\frac{1}{14}$ more than the direct cohesion; which, for stone was 215lbs. for a square inch; for good brick from 280 to 300.

Count Rumford found the cohesive strength of a cylinder of iron an inch in diameter 63466 or 63173*lbs.*; the mean 63320: which is only $\frac{1}{20}$ more than Emerson's result.

Sickingen makes the comparative cohesive strength of gold 150955, of silver 190771, of platina 262361, of copper 304696, of soft iron 362927, of hard iron 559880. Guyton makes platina a little stronger.

In Buffon's experiments b, d, and l, being the breadth, depth, and length of a beam of oak in inches, the weight which broke it in pounds, was $= b\,d^2\left(\frac{54\cdot25}{l} - 10\right)$. See farther the article STRENGTH.

The inquisitive reader may also consult Ritter on Cohesion, Gilbert's Journal, iv. 1.; Benzenberg on Cohesion, Gilbert xvi. 76.; Fontana on Solidity and Fluidity, Soc. Ital. i. 89.; and Dr. T. Young on the Cohesion of Fluids, in the Philos. Transac. for 1805, or in the 2d volume of his Natural Philosophy.

COHE'SIVE. *a.* (from *cohere.*) That has the power of sticking to another.

COHE'SIVENESS. *s.* (from *cohesive.*) The quality of being cohesive.

To COHI'BIT. *v. a.* (*cohibeo,* Latin.) To restrain; to hinder.

To CO'HOBATE. *v. a.* To pour the distilled liquor upon the remaining matter, and distil it again (*Arbuthnot*).

COHOBATION. (*cohabatio*; a term invented by Paracelsus.) Chemists use this term to signify the distillation of a fluid poured afresh upon a substance of the same kind as that upon which it was before distilled, and repeating this operation several times to make it more efficacious.

COHORN (Memnon), the greatest engineer Holland has produced. Among his other works, which are esteemed master-pieces of skill, he fortified Bergen-op-zoom; which, to the surprise of all Europe, was taken by the French in 1747. He wrote a treatise on fortification; and died in 1704, at the Hague.

COHORT, the name of part of the Roman legion, composing about 600 men. There were ten cohorts in a legion, the first of which exceeded all the rest both in dignity and number of men. When the army was ranged in order of battle, the first cohort took up the right of the first line; the rest followed in their natural order: so that the third was in the centre of the first line of the legion, and the fifth on the left; the second between the first and third; and the fourth between the third and fifth: the five remaining cohorts formed a second line in their natural order.

COHORTA'TION. *s.* (*cohortatio,* Lat.) Encouragement by words; incitement.

COIF. *s.* (*coëffe,* French.) The head-dress; a cap (*Bacon*).

COIF, the badge of a sergeant at law, who is called sergeant of the coif, from the lawn coif they wear under their caps, when they are created sergeants. The chief use of the coif was to cover the clerical tonsure. See TONSURE.

CO'IFED. *a.* (from *coif.*) Wearing a coif.

CO'IFFURE. *s.* (*coëffure,* Fr.) Head-dress (*Addison*).

COIGNE. *s.* (French.) A corner (*Shakspeare*).

To COIL. *v. a.* (*cueiffer,* Fr.) To gather into a narrow compass (*Boyle*).

COIL. *s.* (*kolleren,* German.) 1. Tumult; turmoil; bustle (*Shakspeare*). 2. A rope wound into a ring.

COILED. (*tortilis.*) In botany, bent or twisted like a rope. See TORTILIS and TWISTED.

COIMBETORE, a town of Hindustan, and capital of the province to which it gives name, situated at the foot of the Western Gauts, on the river Noyel. This town was taken possession of by general Meadows, on the 22d of July, 1790, having been evacuated by Tippoo Sultan, who left behind him a quantity of grain and military stores. It was defended by a mud fort, but not capable of making a long resistance. It was retaken by Tippoo the year following, and confirmed to him by the peace: 252 miles S.W. Madras, and 90 S. Seringapatam. Lon. 77. 7 E. Lat. 10. 58 N.

COIMBRA, a city of Portugal, capital of Beira, with a bishop's see and a university. Here are 18 colleges, in which are 4000 students, nine churches, eight convents, and about 12,000 inhabitants. Lat. 40. 12 N. Lon. 8. 17 W.

COIN. *s.* (*cuneus,* a wedge, because metal is cut in wedges to be coined.) 1. Money stamped with a legal impression. 2. Payment of any kind (*Hammond*).

Strictly speaking, coin differs from money as the species from the genus. Money is any matter, whether metal, wood, leather, glass, horn, paper, fruits, shells, or kernels, which have currency as a medium in commerce. Coin is a particular species, always made of metal, and struck according to a certain process called coining.

The precise epocha of the invention of money

is too ancient for our annals; and, if we might argue from the necessity and obviousness of the thing, must be nearly coeval with the world.

Whether coins be of equal antiquity, may admit of some doubt; especially as most of the ancient writers are so frequent and express in their mention of leathern-moneys, paper-moneys, wooden-moneys, &c. Some, however, notwithstanding this, are of opinion, that the first moneys were of metal: the reasons they give are, the firmness, neatness, cleanliness, durableness, and universality of metals; which, however, do rather conclude they ought to have been so, than that they actually were so.

In effect, the very commodities themselves were the first moneys, *i. e.* were current for one another by way of exchange; and it was the difficulty of cutting or dividing certain commodities, and the impossibility of doing it without great loss, that first put men on the expedient of a general medium. See EXCHANGE, and MONEY.

The principal writers on coins are as follow: Arbuthnot on ancient Coins. Locke, Lowndes, Snelling, Folkes, and lord Liverpool on English coins. Simon on Irish coins. Le Blanc and Bouteroue on French. Benaven on Italian. Bircherod on Danish, and Brenner on Swedish. Coins in general have been treated by Krause of Hamburgh, Ricard of Amsterdam, Gerhart of Berlin, Marien of Spain, Richbourg and Bonneville of France, and Du Bost of London. We may also mention Smith on Money and Exchange. A general treatise on coins, including exchanges, weights and measures, will speedily be published by Mr. P. Kelly, under the title of the "Universal Cambist."

COIN, in architecture, a kind of dye, cut diagonal-wise, after the manner of the flight of a staircase; serving at bottom to support columns in a level; and at top to correct the inclination of an entablature, supporting a vault.

COIN is also used for a solid angle, composed of two surfaces, inclined towards each other; whether that angle be exterior, as the coin of a wall, a tree, &c. or interior, as the coin of a chamber, or chimney.

To COIN. *v. a.* (from the noun.) 1. To mint or stamp metals for money (*Shakspeare*). 2. To make or invent (*Shakspeare*). 3. To forge any thing, in an ill sense (*Atterbury*).

CO'INAGE. *s.* (from *coin.*) 1. The act or practice of coining money (*Arbuthnot*). 2. Coin; money (*Brown*). 3. The charges of coining money. 4. New production; invention (*Dryden*). 5. Forgery; invention (*Shakspeare*).

COINAGE, or COINING, as above stated, is the art of making money: it is performed either by hammer or mill. This art is now rendered very expeditious, by several ingenious machines. The three finest instruments the minters use are, the laminating engine—the machine for making the impressions on the edges of coins—and the mill. After they have taken the laminæ, or plates of metal, out of the mould into which they were cast, they make them pass and repass between the several rollers of the laminating machine, which being gradually brought closer and closer to each other, at last give each lamina its uniform and exact thickness. Out of each lamina is at once cut as many planchets as it can contain, by means of a sharp steel trepan, of a roundish figure, hollow within and of a proportionable diameter, to shape and cut off the piece at one and the same time. After the planchets have been prepared and weighed with standard pieces, filed or scraped to get off the superfluous part of the metal, and then boiled and made clean, they are brought to the machine which marks them upon the edge; and, finally at the mill, which squeezing each of them singly between two dyes, brought near each other with one blow, forces the two surfaces or fields of the piece to fill exactly all the vacancies of the two engraved figures. The principal pieces of the machines to stamp coins on the edge are two steel laminæ, each about a line thick. One-half of the legend, or of the ring, is engraved on the thickness of one of the laminæ, and the other half on the thickness of the other; these two laminæ are straight, although the planchet marked with them is circular. When a planchet is stamped, the coiners first put it between the laminæ in such a manner, as that these being each of them laid flat upon a copper-plate, which is fastened upon a very thick wooden table, and the planchet being likewise laid flat upon the same plate, the edge of the planchet may touch the two laminæ on each side and in their thick part. One of these laminæ is immoveable, and fastened with several screws; the other slides by means of a dented wheel, which takes into the teeth that are on the surface of the lamina. This sliding lamina makes the planchet turn in such a manner, remains stamped on the edge, when it has made one turn. Only crown and half crown silver pieces are thick enough to bear the impression of letters on their edges.

The coining engine or mill is so handy, that a single man may stamp twenty thousand planchets in one day. Gold, silver, and copper planchets, are all of them coined with a mill, to which the coinage squares, commonly called dyes, are fastened; that of the face under, in a square box garnished with male and female screws, to fix and keep it steady; and the other above, in a little box garnished with similar screws, to fasten the coining square. The planchet is laid flat on the square of the effigy, which is dormant; and they immediately pull the bar of the mill by its cords, which causes the screw set within it to turn. This enters into the female screw, which is in the body of the mill, and turns with so much strength, that by pushing the upper square upon that of the effigy, the planchet, violently pressed between both squares, receives the impression of both at one pull, and in the twinkling of an eye. The planchet, thus stamped and coined, goes through a final examination of the mint wardens, from whose hands it goes into circulation.

Figures of the machinery used in the process described above are given in most of our Encyclopædias, and of these, together with Mr. Huigenan's coining press, in the 2d volume of Gregory's Mechanics: but we conceive it needless to insert them here, especially as a new method of coining has been introduced by Messrs. Bolton and Watt, which is shortly to be the only mode used in this country. For this purpose buildings are erecting on Tower-hill. This machinery invented by these able mechanicians has been long used in the manufacture of copper money; it works the screw-presses for cutting out the circular pieces of copper, and coins both the edges and faces of the money at the same time, with such superior excellence and cheapness of workmanship as will prevent clandestine imitation. By this machinery, four boys are capable of striking 30,000 pieces of money in an hour, and the machine acts at the same time as a register, and keeps an unerring account of the number of pieces struck.

In the coining of medals, the process is the same, in effect, with that of money; the principal difference consisting in this, that money having but a small relievo receives its impression at a single stroke of the engine; whereas for medals, the height of their relievo makes it necessary that the stroke be repeated several times: to this end the piece is taken out from between the dyes, heated, and returned again; which process, in medallions and large medals, is repeated fifteen or twenty times before the full impression be given: care must be taken, every time the planchet is removed, to take off the superfluous metal, stretched beyond the circumference, with a file. Medallions, and medals of a high relievo, are usually first cast in sand, by reason of the difficulty of stamping them in the press, where they are put only to perfect them; because the sand does not leave them smooth, clear, and accurate enough.

Coinage (British). It was only in the reign of William III. that the hammer-money ceased to be current in England, where till then it was struck in that manner, as in other nations. Before the hammer specie was called in, the English money was in a wretched condition, having been filed and clipped by natives as well as foreigners, insomuch that it was scarce left of half its value. The British coinage is now chiefly performed in the Tower of London, where there is a corporation for it, under the title of the Mint. Formerly there were here, as there are still in other countries, the rights of seinorage and brassage: but since the eighteenth year of king Charles II. there is nothing taken either for the king or for the expences of coining; so that weight is returned for weight, to any person who carries his gold and silver to the Tower. The specie confined in Great Britain is esteemed contraband, and not to be exported: but all foreign specie may be sent out of the realm, as well as gold and silver in bars, ingots, dust, &c.

Counterfeiting the king's money, or bringing false money into the realm counterfeit to the money of England, clipping, washing, rounding, filing, impairing, diminishing, falsifying, scaling, lightening, edging, colouring, gilding, making, mending, or having in one's possession, any puncheon, counter-puncheon, matrix, stamp, dye pattern, mould, edger, or cutting-engine: all these incur the penalty of high treason. And if any person shall counterfeit any such kind of gold or silver as is not the proper coin of the realm, but current therein by the king's consent, he shall be guilty of high treason.

If any person shall tender in payment any counterfeit coin, he shall for the first offence be imprisoned six months, for the second offence two years, and for the third offence shall be guilty of felony without benefit of clergy.

Blanching copper or other base metal, or buying or selling the same; and receiving or paying money at a lower rate than its denomination imports; and also the offence of counterfeiting copper half-pence and farthings, incur the penalty of felony, but within clergy. Counterfeiting coin not the proper coin of this realm, nor permitted to be current therein, is misprision of treason. A person buying or selling, or having in his possession, clippings or filings, shall forfeit 500l. and be branded in the cheek with the letter R. And any person having in his possession a coining-press, or casting bars or ingots of silver in imitation of Spanish bars or ingots, shall forfeit 500l.

A reward of 40l. is given for convicting a counterfeiter of the gold or silver coin; and 10l. for a counterfeiter of the copper coin. 16 Geo. II. and 13 Geo. III. c. 28 and 77.

There are some differences and peculiarities respecting the coinage of different cities and countries, as Barbary, Muscovy, Persia, Spain, &c. but they are not of sufficient importance to take up any room in this place. See Money.

To COINCI'DE. *v. n.* (*coincido*, Latin.) 1. To fall upon the same point (*Cheyne*). 2. To concur; to be consistent with (*Watts*).

COI'NCIDENCE. *s.* (from *coincide.*) 1. The state of several bodies, or lines, falling upon the same point (*Bentley*). 2. Concurrence; consistency; tendency of many things to the same end; occurrence of many things at the same time (*Hale*).

COI'NCIDENT. *a.* (from *coincide.*) 1. Falling upon the same point (*Newton*). 2. Concurrent; consistent; equivalent (*South*).

COINDICA'TION. *s.* (from *con* and *indico*, Latin.) Many symptoms betokening the same cause.

CO'INER. *s.* (from *coin.*) 1. A maker of money; a minter (*Swift*). 2. A counterfeiter of the king's stamp. 3. An inventor (*Camden*).

COINING, in the tin-works, is the weighing and stamping the blocks of tin with a lion rampant, performed by the king's officer; the duty for every hundredweight being four shillings.

To CO'JOIN. *v. n.* (*conjungo*, Latin.) To join with another in the same office (*Shaks.*).

COIRE, or Chur, the capital of the country of the Grisons, in Switzerland. It is the see of a bishop, whose prelate has the right of coining money; and it is inhabited by Roman catholics and protestants, the latter being most numerous. Lat. 46. 50 N. Lon. 9. 25 E.

CO'ISTRIL. *s.* A coward; a runaway (*Shakspeare*).

COIT. *s.* (*kote*, a die, Dutch.) A thing thrown at a certain mark; a quoit (*Carew*).

COI'TION. *s.* (*coitio*, Latin.) 1. Copulation; the act of generation (*Ray*). 2. The act by which two bodies come together (*Brown*).

COITUS. (*coitus*, from *coeo*, to go together). The conjunction of the male and female in the act of procreation.

COIX. Job's tears. In botany, a genus of the class monœcia, order triandria. Males: in remote spikes; calyx a two-flowered glume, awnless; corol a two-valved glume, awnless. Fem.: calyx a two-flowered glume, awnless; corol a two-valved glume, awnless; style two-parted; seed covered with the long calyx. Three species: one of America; two of the East-Indies. Of these the chief is

C. lachryma Jobi: common to many parts of the East-Indies; and often cultivated in Spain and Portugal even by the poor, who occasionally grind the seeds into flour and make their bread of it. From Spain this plant is often obtained for the gardens of our own country. It is an herbaceous annual rising about two feet high, with branched culms; leaves wrinkled underneath of the reed shape; seeds ovate. The flowers are in spikes axillary, and on short petioles. The seeds are about the size of a common pea, enclosed in capsules, and of different colours. The negroes of the West Indies often string them on silk, and use them for bracelets.

COKE (Edward), an eminent English judge. He was born at Mileham, in Norfolk, in 1549, and educated at Trinity college, Cambridge; from whence he removed to Clifford's-inn, and a year afterwards to the Inner Temple. The first cause which he pleaded was in 1578, about which time he was chosen reader at Lyons-inn, and continued his lectures three years. Soon after his admission at the bar he married a lady of considerable fortune, who brought him ten children. In 1592 he was appointed solicitor-general to the queen; and on losing his wife, he married in 1598 the daughter of Thomas lord Burleigh. In 1600 he prosecuted, as attorney-general, the earls of Essex and Southampton. Three years afterwards he received the honour of knighthood; and conducted the prosecution of sir Walter Raleigh, whom he treated in a brutal manner. His speeches at the trial of father Garnett, and the other conspirators in the gunpowder plot, are deemed his master-pieces in that way. That year he was appointed chief justice of the common pleas; and in 1613 he was removed to the king's-bench, at which time he was sworn of the privy-council. In the affair of sir Thomas Overbury's murder, sir Edward conducted himself with commendable spirit; but soon afterwards he fell into disgrace by opposing the king's prerogative, and contending with the chancellor Egerton. In 1616 he was removed from his office, on which occasion his old adversary Bacon wrote him a stinging letter, which, though it contained plain truths, was an ungenerous triumph over a fallen foe. In order to get into favour again, he projected a match between sir John Villiers, brother of the favourite, and his youngest daughter, which occasioned a bitter quarrel between him and his wife. The lady left his house with her daughter, and sir Edward fetched back his daughter by force, which occasioned his wife to complain of him to the privy-council. The affair was at last patched up, and the marriage was concluded. In the parliament of 1621, sir Edward joined the popular, or patriotic side; for which he was committed to the Tower. He did not remain in confinement long; but never obtained the favour of James afterwards. He did not sit in parliament again till 1628, when he spoke with great spirit against the court measures, and named the duke of Buckingham as the author of all the calamities of the nation, although he had before called the same man the saviour of the nation! Private pique and disappointed ambition make goodly patriots. On the dissolution of that parliament he retired to his seat in Buckinghamshire, where he died in 1634, aged 85. His papers were seized at the time of his death by sir Francis Windebank, by order of council. In 1641 they were delivered up, in consequence of an application to parliament for that purpose. The first part of his Reports appeared about 1600, and the last, or thirteenth, about 1655. His Institutes in four parts are invaluable; the first of which is a translation and comment on sir Thomas Littleton's Tenures. There are also other law-pieces of his in print. (*Watkins.*)

Coke, denotes pit-coal or sea-coal charred. It is prepared by burning them in ovens constructed for this purpose, and extinguishing the fire in the manner used for making charcoal.

COL, or Con, an Italian preposition, used in music, signifying *with*.

Col, one of the Hebrides of Scotland. Lat. 57. 0 N. Lon. 7. 15 W.

CO'LANDER. *s.* (*colo*, to strain, Latin.) A sieve through which a mixture is poured to retain the thicker parts; a strainer (*May*).

COLARBASIANS, or Colorbasians, a sect of Christians in the second century; so called from their leader Colarbasus, a disciple of Valentinus; who, with Marcus, another disciple of the same master, maintained the whole plenitude, and perfection, of truth and religion, to be contained in the Greek alphabet; and that it was upon this account that Jesus Christ was called the alpha and omega.

COLARIN, in architecture, a cincture.

COLA'TION. *s.* The art of filtering or straining.

CO'LATURE. *s.* (from *colo*, Latin.) 1.

The act of straining; filtration. 2. The matter strained.

COLBERG, a strong, handsome seaport of Prussian Pomerania, remarkable for its salt-works. Lat. 54. 21 N. Lon. 15. 39 E.

CO'LBERTINE. *s.* A kind of lace worn by women (*Congreve*).

COLCHESTER, the chief town in Essex, is the ancient Colonia Camelodunum, from which word Colonia, both the town and the river Colne on the south side of which it is seated received their names. The Saxons called it Colneceaster. That it flourished under the Romans, several buildings full of their bricks, and innumerable quantities of coin dup up in and about it, fully evince. The emperor Constantine the Great was said to be born here, though Gibbon questions the fact. The walls wherewith the town was encompassed are still tolerably entire, except on the north side, where they are much decayed: they are generally about nine feet thick. The famous abbey-gate of St. John is still standing, and allowed to be a curious and beautiful piece of Gothic architecture. It was built, together with the abbey, in 1097; Gudo, steward to William Rufus, laid the first stone. St Ann's chapel, standing at the east end of the town, is valuable in the esteem of antiquarians as a building of great note in the early days of Christianity. It is now pretty entire. St. Botolph's priory was founded by Ernulphus in the year 1110. It was demolished in the wars of Charles I. but its ruins still exhibit a beautiful sketch of ancient masonry. The castle, which is tolerably entire, is said to have been built by Edward, son of Alfred; it is a magnificent structure, and of late greatly improved. Here is a valuable library. Colchester is a borough by prescription, and under that right sends two members to parliament, all their charters being silent upon that head. The charter was renewed in 1763. The town is now governed by a mayor, recorder, 12 aldermen, 18 assistants, and 18 common-councilmen. It had 16 parish churches, in and out of the walls, but now only 12 are used, the rest being damaged at the siege in 1648. Here are also six dissenting meeting-houses. The number of houses is 1,997, and of inhabitants 11,520. This town is the most noted in England for the making of baize; it is also of special note for candying the eringo roots, and for oysters. The markets are on Wednesdays and Saturdays. Lat. 51. 55 N. Lon. 1. 0 E.

COLCHICUM. (*colchicum*, from *Colchis*, a city of Armenia; where this plant is supposed to have been very common). Common meadow saffron. In botany, a genus of the class hexandria; order trigynia. Calyx a spathe; corol six-parted; the tube arising from the root; capsules three, superior, connected, inflated, many-seeded. Three species.

1. C. montanum, a native of Spain, the leaves of which appear in the autumn with the flowers.

2. C. variegatum. A native of the Greek islands, with undulate, widely-spread leaves.

3. C autumnale; with flat, lanceolate leaves; common to the meadows of our own country, the root of which is said to possess diuretic and expectorant qualities; and with this view an oxymel and a syrup are directed by the colleges of London and Edinburgh. An over-dose proves narcotic and cathartic.

COLCHIS, a country of Asia, at the south of Asiatic Sarmatia, east of the Euxine Sea, north of Armenia, and west of Iberia. It is famous for the expedition of the Argonauts, and as the birth-place of Medea.

COLCOTHAR OF VITRIOL. A preparation of vitriolum ferri. See VITRIOLUM.

COLD. *a.* (colꝺ, Saxon.) 1. Not hot; not warm; gelid (*Arbuthnot*). 2. Chill; having sense of cold (*Shakspeare*). 3. Having cold qualities; not volatile (*Bacon*). 4. Indifferent; frigid; without passion (*Rowe*). 5. Unaffecting; unable to move the passions (*Addison*). 6. Reserved; coy; not affectionate (*Clarendon*). 7. Chaste (*Shakspeare*). 8. Not welcome (*Shakspeare*). 9. Not hasty; not violent. 10. Not affecting the scent strongly (*Shakspeare*). 11. Not having the scent strongly affected (*Shakspeare*).

COLD. *s.* (from the adjective.) 1. The cause of the sensation of cold; the privation of heat (*Bacon*). 2. The sensation of cold; chilness (*Dryden*). 3. A disease caused by cold; the obstruction of perspiration. See CATARRHUS.

COLD, a privation of heat. It is generally conceived to be nothing positive, but altogether of the negative kind. The human body contains within itself, as long as it is living, a principle of warmth: if any other body, being in contact with it, does at the same time impart to it more caloric or heat than it obtains from the human body, it is said to be warm; but if it receives from the human body more heat than it remits, it is said to be cold. A substance which is in contact with our hand, and the temperature of which is more elevated than that of the hand, will yield to it a portion of its caloric depending upon the relation between the specific heats; and on occasion of the resulting sensation, we say of this substance that it is hot; on the contrary, a substance which we touch, and whose temperature is lower than that of our hand, takes from it a portion of its caloric; and on account of the sensation which is excited in us by this privation of caloric, we say that such substance is cold. Thus the temperature of our bodies is with respect to us the limit of heat and of cold; but, at bottom, there is nothing more here than a greater or less difference between two modifications which to us appear opposed, judging from the testimony of the senses: thus it happens that in proportion as the limit varies, that is to say, as the temperature of our bodies is elevated or depressed, we shall think the same substance cold, which to us had appeared hot when we were in other circumstances, and reciprocally.

It is well known to every body that caves are found cold during the summer, and hot during the winter. The contrast of these two

sensations arises from this, that the temperature of the subterraneous passages in question is nearly constant, and of an intermediate degree between those which correspond to the temperature of our bodies in the two seasons.

There is nevertheless much uncertainty upon this subject; and several philosophers of the present day, and especially count Rumford and Mr. Davy, have attempted to revive the doctrine that heat is not a substance *sui generis*, but a mere privation of cold from intestine commotion of the elementary particles of the substance heated: while at the same time, Dr. Herschel has endeavoured to re-establish the theory that there are frigorific as well as calorific rays issuing in all directions through the heavens; and hence to resuscitate the physical system of Democritus and Epicurus in several of its most important points.

Nothing appears at first sight more directly contradictory to the common opinion of cold being only relative, and only a negative term implying the abstraction of heat, than the facts which shew the apparent radiation, absorption, and reflexion of cold; the evidence of which stands on the same ground as the corresponding motions of heat, namely, on the rise or fall of the thermometer. If the rise of the liquor on the scale of a thermometer, whose bulb is placed in the focus of a mirror, be considered as a proof of the propulsion of certain calorific rays from a distant heated surface, and their subsequent reflexion according to the laws of catoptrics; the sinking of the same thermometer liquor under similar circumstances of position, when the surface which before was sensibly hotter than the atmosphere is now sensibly colder, would seem from a parity of reasoning to indicate the propulsion and reflexion of frigorific rays.

Let us attend to the experiments of Saussure and Pictet, as they relate to the reflection of heat, and the apparent radiation of cold.

These two philosophers having made a ball of iron of 54 millimetres, or two inches diameter, of a strong red heat, left it to cool gradually to the point where it was no longer luminous, even in a dark place. They had previously disposed two concave mirrors, the one opposite to the other, at about 4 metres, or 12 feet distance; and then fixed the ball in the focus of the one, while an air-thermometer was held at the focus of the other. The chamber where the experiment was performed was completely close, and every precaution had been taken to remove all that might occasion accidental variations in the temperature of the air. Immediately as the ball was placed at its focus, the thermometer which occupied the other, and which previously stood at 4 degrees above zero, began to rise, and in 6 minutes arrived at 14½ degrees, while a second thermometer suspended out of that focus, at the same distance from the ball and from the observer, mounted only to 6 degrees: whence it results, that in this experiment the reflexion of the radiant caloric had elevated the temperature 8½ degrees. To remove still farther the suspicion that this phenomenon was the effect of a light imperceptible to the eyes, Pictet has repeated the experiments by substituting for the ball of iron a phial full of boiling water, when the thermometer situated at the other focus indicated an elevation of temperature of more than one degree.

These experiments have been followed by another that is very curious, and capable of imposing upon an observer little versed in these topics, who had not been persuaded beforehand that cold cannot be reflected. The apparatus having been disposed as in the preceding experiments, an air-thermometer was placed at the focus of one of the mirrors, and a phial full of snow at the focus of the other; immediately the thermometer descended several degrees, and then mounted again as soon as the phial was taken away: the vessel having been again placed at the focus of the same mirror, some nitric acid was poured upon the snow, and the augmentation of cold which resulted caused the thermometer to descend 5 or 6 degrees.

The first moment was that of surprise; but the explication of the phenomenon soon followed. To comprehend it, let us mentally suppress the two mirrors; then the same thing will happen to the thermometer as to the surrounding bodies, that is to say, it will yield a part of its caloric, which will be continually communicated to the snow, in virtue of the affinity by which it attracts to itself that fluid: another quantity of caloric will escape from the thermometer under the radiant form, and will distribute itself between the vessel and the surrounding bodies. Let us now restore the two mirrors to their places: then the portion of radiant caloric which had been thrown off for the snow, falling upon the mirror at whose focus the thermometer is found, will be reflected towards the other mirror, and thence to the vessel, which will speedily absorb it; and this effect which will be continually repeating, will determine a much more abundant and rapid emission of radiant caloric supplied by the thermometer, than that which would have obtained without the intervention of the mirrors. We have here the same advantage to diminish the heat of the thermometer as we have to increase it, when, instead of a body colder than it, there is placed at the focus of the mirror one that is hotter; only, in the experiment of the phial of snow, the rays of caloric pursue a route opposite to that which it would have followed in the experiment of the heated ball; and it is this change of direction that imposes on the imagination, presenting to it a true reflexion of caloric under the appearance of a reflected cold. (*Haüy's Philos*. vol. ii.)

Mr. Leslie also found, not only the same effect in this experiment, but that the action of a cold radiating surface upon the tin reflector produced exactly the same proportional effect upon the differential thermometer as the hot radiating surface, only in the opposite direction of the scale. The differential thermometer, which is always at zero when both bulbs are

equally heated, is beautifully calculated to shew this striking experiment. Thus, if the difference of temperature between the heat-radiating substance and the atmosphere be 60 degrees, and if this raises the thermometer 45 degrees, the same difference between the cold-radiating substance and the atmosphere will sink the thermometer 45 degrees, and so in proportion; so that a cold of 16 degrees will sink the thermometer 12 degrees; for 60 : 45 : : 16 : 12. (*Leslie on Heat*).

A very great degree of cold may be produced by mixing together different solids, which suddenly become liquid. But as such mixtures are often employed in chemistry, in order to be able to expose bodies to the influence of a low temperature, it will be worth while to enumerate the different substances which may be employed for that purpose, and the degree of cold which each of them is capable of producing. The first person who made experiments on freezing mixtures was Fahrenheit. But the subject was much more completely investigated by Mr. Walker, in a paper published in the Philosophical Transactions for 1795. Since that time several curious additions have been made by professor Lowitz, particularly the introduction of muriat of lime, which produces a very great degree of cold when mixed with snow. The experiments of Lowitz have been lately repeated and extended by Mr. Walker. The result of all these experiments may be seen in the following table.

Table of freezing-mixtures.

Mixtures.	parts.	Thermometer sinks.
1. Muriat of ammonia	5	From 50° to 10°
Nitre	5	
Water	16	
2. Muriat of ammonia	5	From 50 to 4
Nitre	5	
Sulphat of soda	8	
Water	16	
3. Nitrat of ammonia	1	From 50 to —4
Water	1	
4. Nitrat of ammonia	1	From 50 to —7
Carbonat of soda	1	
Water	1	
5 Sulphat of soda	3	From 50 to —3
Diluted nitric acid		
6. Sulphat of soda	6	From 50 to —10
Muriat of ammonia	4	
Nitre	2	
Diluted nitric acid	4	
7. Sulphat of soda	6	From 50 to —14
Nitrat of ammonia	5	
Diluted nitric acid	4	
8. Phosphat of soda	9	From 50 to —12
Diluted nitric acid	4	
9. Phosphat of soda	9	From 50 to —21
Nitrat of ammonia	6	
Diluted nitric acid	4	
10. Sulphat of soda	8	From 50 to 0
Muriatic acid	5	
11. Sulphat of soda	5	From 50 to 3
Diluted sulphuric acid	4	
12. Snow	1	From 32 to 0
Common salt	1	
13. Muriat of lime	3	From 32 to —50
Snow	2	
14. Potash	4	From 32 to —51
Snow	3	
15. Snow	1	From 20 to —60
Diluted sulphuric acid	1	
16. Snow or pounded ice	2	From 0 to —5
Common salt	1	
17. Snow & diluted nit. acid		From 0 to —46
18. Muriat of lime	2	From 0 to —66
Snow	1	
19. Snow or pounded ice	1	From —5 to —18
Common salt	5	
Muriat of ammonia and nitre	5	
20. Snow	2	From —10 to —56
Diluted sulphuric acid	1	
Diluted nitric acid	1	
21. Snow or pounded ice	12	From —18 to —25
Common salt	5	
Nitrat of ammonia	5	
22. Muriat of lime	3	From —40 to —73
Snow	1	
23. Diluted sulphuric acid	10	From —68 to —91
Snow	8	

In order to produce these effects, the salts employed must be fresh chrystallized, and newly reduced to a very fine powder. The vessels in which the freezing mixture is made should be very thin, and just large enough to hold it, and the materials should be mixed together as quickly as possible.

In the Philosophical Transactions for 1801, p. 135, there is a table given, divided into classes: in the first rank of these classes of mixtures, Mr. Walker has not specified the temperature at which the materials were previous to mixing; the reader being informed, in a paragraph which immediately follows the table, that it is immaterial, the result being the same as stated in the table, whatever may be the temperature of the materials at mixing. So that it is not requisite to specify the temperatures at which it was supposed to be necessary the materials should be previous to mixing, in order to produce the effects stated.

Cold. *Its effects on animals.*—This is a subject that yet opens a wide field for speculation. Different animals, it is well known, will endure very different degrees of cold without injury: the cause of this has never hitherto been fully ascertained, nor the different kinds of animals regularly classified. Some animals perish suddenly upon the approach of intense cold; others on the contrary instead of perishing, are only thrown into a state of lethargic insensibility, from which they revive upon the return of warm weather and the stimulus of its genial heat. Even these last have not yet been regularly arranged upon any scientific principle. Some again will endure very limited degrees both of heat and cold; others require very high degrees of heat, and are destroyed by a small portion of cold; a third sort

will endure a very intense degree of cold, and are killed by trivial accessions of heat; while a fourth kind on the contrary will exist throughout almost the largest scale of atmosphere we can conceive, and brave with equal power the extremes of heat and frigidity; and these, in some instances animals of the lowest, and in others, of the highest and most perfect kind. Let us support these observations by a few examples.

Insects for the most part die instantly upon the approach of severe cold; a few, but only a few, possess the privilege of being thrown into a preservative torpidity. Most infusory animalcules do the same: they know nothing of winter-sleep, except in a few, and indeed a very few, instances. The experiments of Spalanzani and Muller, are fully in proof of this assertion. Such facts would lead us to conceive that it was the two lowest orders of animals that died most speedily upon exposure to cold; and that following the scale in its ascent, those nearest in make to insects and worms, would shew the next facility of destruction upon frigid applications, and that man as being at the head of the scale, would evince the greatest tenacity to life of all animals whatever. But this is by no means the case; for man himself perishes, like insects and worms, without any preservative torpidity whatever; at least the instances to the contrary are as few in man as in worms and insects, and perhaps still fewer: while on the contrary, the animals chiefly protected by this wonderful and most curious power, are those which rank far below the first, and very little above the two last, such as frogs, toads, lizards; the hedge-hog, land-tortoise, marmot, dormouse, various species of the rat tribe, and perhaps several genera of birds.

What then is the peculiar character by which hybernating animals, or those capable of preserving life by torpidity, are to be distinguished? And here again we appear to be completely out at sea, without helm or compass. The general answer, derived indeed from M. de Buffon, is, that these are all cold-blooded animals: and that the peculiarity we refer to proceeds from this circumstance. It is not a fact, however, that all hybernating animals, nor even perhaps that the greater number of them, are cold-blooded; while on the contrary, there are various kinds of cold-blooded animals that are destitute of this provision. Many species of the viper tribe, though cold-blooded animals, die at once, without torpidity, upon application of extreme cold: fishes seldom evince torpidity; and though toads and lizards are cold-blooded animals, marmots and bats possess warm blood certainly; and perhaps hedgehogs; to say nothing of the swallow and other torpid birds.

To pursue this subject, however, would be to wander too far from the point immediately before us. Yet it is a subject of very considerable importance. What is the cause of this preservative torpidity evinced by hybernating animals? Is it a cause derived from habit, as maintained by Mr. Gough; or dependant alone upon a gradual augmentation of cold, as advanced by M. Du Pont de Nemours? Is it confined to peculiarity of organic structure, or may all animals become benefited by it upon its proper application? Will torpidity defend man against the effects of severe cold, as well as the marmot; supply the purpose of food; and restrain the vital principle from flight? These questions are rather connected with the theories of SLEEP and of WINTER SLEEP, than with the present article; and under those terms we shall prosecute this highly important subject. In the mean time, the reader may consult the explanation of both sleep and winter-sleep, as given in Mr. Good's Notes to his Translation of Lucretius, vol. ii. 137—141; and 148—149: in which he endeavours to assign the cause of the extraordinary preservation of life exhibited in the case of Mrs. Woodcock, who continued buried under a drift of snow near Cambridge for eight days without sustenance of any kind: as also the cause of other phenomena of a similar kind.

What are the utmost limits of either heat or cold in which animal life can exist, is also a question that has never yet been determined. Man himself is capable of enduring very wonderful degrees both of heat and cold. Many persons associated together for the purpose of experiment, have borne a room heated to 198°, 210°, 211° of Fahrenheit, which last is only one degree below the boiling point. Sir Charles Blagden (Phil. Trans.) bore a heat of 260°: the oven-girls in some parts of Germany have borne a heat of 257° for a quarter of an hour, and one girl supported it augmented to 284° without inconvenience. Dogs have existed without apparent inconvenience in 236°; and a species of tænia has been found alive in a boiled carp.

Man on the contrary is capable of enduring as extraordinary extremes of cold as he is of heat. Boerhaave conceived that the utmost degree of cold that could take place was zero in Fahrenheit's thermometer, or 14½ below freezing in Reaumur's, at which point he remarks, that men, animals, and vegetables, soon perish. This great man, however, was mistaken. Fahrenheit's thermometer, in some winters at St. Petersburgh, has fallen 29°, and once 33° below 0. The cold at Quebec has occasionally sunk it to 42°. Maupertius endured it at Tornao as low as 51°. But even all this can bear no comparison with the cold sometimes endured in many parts of Siberia, as Tomsk, Kirenga, Jeneseik, where the thermometer has been seen at 90°, 128°, and even 178°, below 0: in all which cases respiration is accompanied with prodigious pain, and seems to fill the lungs as with boiling oil; while from the increased elasticity of the air, the surrounding rocks and trees often split with reports like cannon.

But these are isolated facts: what result has the physiologist drawn from them? The common conclusion is, that man is capable of liv-

ing in a larger scale of temperature than any other animal: and one of the theories offered to account for this conclusion is, that he secretes a larger portion of sensorial power, which thus arms him equally against all extremes. It is unnecessary to examine into the truth of this theory, for the conclusion itself is false, which it is purposely built to support. Insects of various kinds will live in boiling water, which man cannot do; but then these insects cannot in general endure the cold sustained by man: yet the hydrophil (water-beetle) and frogs, can endure both; the severest frost only torpifies, but does not kill them; and they have been known to exist in boiling water without apparent inconvenience. There is a species of infusory animalcule, particularly examined by Spalanzani, that is never hatched but when the infusion is at the point of freezing; and yet this same species by repeated trials appeared capable of existing in a boiling heat, and of retaining life beyond every other species of animalcules exposed to the same intensity.

We know nothing of the cause of all this; worms, insects, animals; all, and equally afford proofs of the most extraordinary tenacity to life; and all and equally again, in other genera or tribes, afford proofs of the most easy destruction by a simple change of temperature. These observations may be extended to the vegetable world; how many thousands of our most beautiful plants can only be reared in the heat of a stove! how many are there that will endure the heat of a stove, and yet not be destroyed by external frost! The fuchsia, in several of its species, affords us proofs of this last remark: whilst the winter aconite, liverworts of various kinds, the hepatica nobilis (a species of narcissus), black hellebore, and terrestrial mosses, like the above animalcule noticed by Spalanzani, only flourish, become impregnated, and fructify amidst the rigours of winter. See the articles SLEEP and WINTER SLEEP.

COLD, in veterinary science, a disease, not essentially different from that of the same name in human medicine, produced by a sudden change of the atmosphere, and affecting the animal either locally or generally. The most common causes are new unaired stables, change of stable from warm to cold, doors or windows suddenly thrown open and continued so at unseasonable times, currents of air improperly admitted, exposure to the night-air, being suffered to stand still in the cold air immediately from a hot stable, or, when in a state of perspiration, the unnatural practice of washing horses in such a state with cold water at any season, sudden turning out to grass from warm keeping, damp body-cloths or saddle-pads.

It is to the interest of every proprietor, however poor, to be provided with some kind of covering to throw over his horse's loins, on any sudden transition from heat to cold; it must also be remembered, that a horse which works and runs at grass (in cold seasons more particularly) ought never to be curried, which renders his body too susceptible of impression from the air; such should only be rubbed with wisps. Should a horse take cold at grass, it is infinitely better to house him by night, in a state of moderate warmth, and allow a few mashes and warm water, from which treatment he will most probably be ready to brave the weather again, in a sound and healthy state, in the course of a few days, than to suffer him to languish amidst the damps of the soil, with a running at the nose, which may continue for months. The usual objection to this practice is, that it induces a tender habit, which argument is also much used against clothing horses in colds; but we have always observed, that the animal body, under the influence of obstructed perspiration, is still more liable to an accession or increase of catarrh from that very account, and by no means so much so after the disease has subsided, and the vessels are less distended; which is an answer to the objection in both cases.

Horses which are exposed to all weathers, but which have still caught cold, and yet cannot be spared from their constant duty, ought, on the first appearance of the disease, to have clothing allowed during their labour, to lose some blood, to have nitre in their water every night, and a cordial ball-drink. This is the unfortunate description of horses which is destined to undergo all the dreadful evils of neglected and accumulated catarrh—cough, pleurisy, asthma, yellows, rheumatism, glanders, consumption.

The common symptoms of a cold in a horse, in its first stage, are well known—cough, discharge of lymph, or water from the eyes and nostrils, and occasionally hanging down the head. If attended to at first, as it ever ought in this land of rheums, at any rate in cold seasons, the disease will immediately submit; a few days', or even a single day's, warm treatment in the stable, a little additional clothing, warm water, and mashes, generally do the business: the vessels, being relieved from a superfluous load, will contract, and the horse will not be liable to relapse on exposure to the air. Spirit, or salt of hartshorn, in warm ale, sweetened with syrup of poppies, given twice a-day, is an excellent medicine on the first attack of a cold; but great care ought to be had that the dose of hartshorn be not too large, lest it excoriate the throat of the horse, and choke him. Two or three tablespoonfuls of the spirit may be given for a dose, in a quart or three pints of beer: a proper judgment may be made by the taste of the drench. Or fresh ground ginger, from two to four drachms, is an excellent substitute for the hartshorn.

Should the disease, either from neglect, the common cause, or sudden accident, be of a more confirmed and serious nature; should there be a considerable discharge from the nostrils, an inflammation of the glands under the jaws, attended with loss of appetite; medical aid must be called in, or the business may be very tedious, besides the risk of leaving in the constitution the seeds of certain of the most dangerous chronic diseases.

It is generally a good practice to bleed at the

commencement, which ought to be repeated in a few days, if fever and fulness of the vessels indicate the necessity. After which, refrigerant and demulcent balls of cream of tartar, juniper-berries, and liquorice juice, dissolved in water, may be found highly salutary.

COLDE'NIA. In botany, a genus of the class tetandria tetragynia. Calyx four-leaved; corol funnel-form; styles four; nuts two, two-celled. One species only, a native of India. A depressed, annual plant, with branches trailing on the ground, about six inches from the root, with small, blue, sessile, axillary flowers, growing in clusters.

COLDING, a small town of North Jutland, in Denmark. Lat. 55. 35 N. Lon. 10. 15 E.

CO'LDLY. *ad.* (from *cold.*) 1. Without heat. 2. Without concern; indifferently; negligently (*Swift*).

CO'LDNESS. *s.* (from *cold.*) 1. Want of heat (*Boyle*). 2. Unconcern; frigidity of temper (*Hooker*). 3. Coyness; want of kindness (*Prior*). 4. Chastity (*Pope*).

COLDSHIRE IRON, such as is brittle when it is cold. See IRON.

COLDSTREAM, a small market town of Berwickshire, in Scotland. Lat 55. 36 N. Lon. 2. 5 W.

COLE. *s.* (capl, Saxon.) Cabbage.

COLE-SEED. In botany. See BRASSICA.

COLE-RAPE. See BRASSICA.

COLE-WORT. See BRASSICA.

COLE-WORT (Sea.) See CRAMBE and CONVOLVULUS.

COLE-MOUSE. In ornithology. See PARUS.

COLEBROOK DALE, on the banks of the Severn, in Shropshire, is a winding glen, between two vast hills, which break into various forms, being all thickly covered, and forming beautiful sheets of hanging woods. Here are the most considerable iron works in England. "The noise of the forges, mills, &c." says Mr. Young, "with all their vast machinery, the flames bursting from the furnaces, with the burning of coal, and the smoke of the limekilns, are altogether horribly sublime." Two bridges entirely made of cast-iron, which have been thrown over the Severn, give these scenes a still nearer resemblance to the ideas in romance. There is, also, in the dale a remarkable spring of fossil tar, or petroleum, which has yielded a vast quantity of that substance; but it is now much diminished. A work, for obtaining a similar kind of tar, from the condensed smoke of pit-coal, has been erected in the dale.

COLEOPTERA. Coleopterous insects. (from κολεος, a sheath or shell, and πτερον, a wing.) The first order of insects in Linnéus's zoological system; thus ordinally characterised; wings four, the upper crustaceous with a straight suture; giving the appearance of being covered with crustaceous shells. See ZOOLOGY.

COLERAIN, a town of Londonderry, in Ireland, which sends two members to parliament. Lat. 55. 16 N. Lon. 6. 30 W.

COLES (Elisha), an English lexicographer, born in Northamptonshire, and brought up at Oxford. He afterwards became an usher in Merchant Taylors' school; but died in Ireland about 1680. He wrote several useful books, particularly an English-Latin Dictionary, in 8vo. which has gone through many editions.

COLESHILL, a town of Warwickshire, with a market on Wednesdays. Lat. 52. 32 N. Lon. 1. 35 W.

COLFORD, a town of Gloucestershire, with a market on Tuesdays. Lat. 51. 48 N. Lon. 2. 40 W.

COLGIAT, a gantlet, which the Turks carry in war.

COLICA. (*colica*, κωλικη, from κωλον, the colon, one of the large intestines). The colic. It is known by a pain in the belly, and a sensation like a twisting round the navel, attended with vomiting and costiveness. This genus of diseases is arranged by Cullen in the class neuroses, and other spasmi. The species of colic are: 1. Colica spasmodica, arising from spasm. 2. Colica pictonum, the painter's, or Devonshire, or white lead colic, which arises from the poison of white lead, and is succeeded by palsy of the hands. 3. Colica stircorea, which is common to persons of a costive habit of body.

CO'LICK. *a.* Affecting the bowels (*Milt.*).

COLIPHIUM, a name given by Athenæus, and some other authors, to coarse bread made of meal with the bran among it, and such as is eaten by the poorer people in most countries. The word is derived from κωλον, a limb, and ιφι, strength, and is a very expressive word, as this sort of bread makes people robust and strong, and is greatly preferable to any other kind for people of strong constitutions, who use hard labour, or much exercise.

COLIR, an officer in China, who may properly be called an inspector, having an eye over what passes in every court or tribunal in the empire. In order to render him impartial, he is kept independent, by having his post for life. The power of the colirs is such, that they make even the princes of the blood tremble.

COLISEUM, or COLISÆUM, in the ancient architecture, an oval amphitheatre, built at Rome by Vespasian, in the place where stood the bason of Nero's gilded house.

COLIUS. Coly. In zoology, a genus of the class aves, order passeres. Bill short, thick, convex above, flat beneath; upper mandible bent down at the tip; nostrils small at the base of the bill, and nearly covered with feathers; tongue jagged at the tip; tail long, wedged. Seven species; chiefly natives of the Cape of Senegal.

COLLAERT (Adrian), an eminent engraver who flourished about 1550, was born at Antwerp. After having learned in his own country the first principles of engraving, he went to Italy, where he resided some time to perfect himself in drawing. He worked entirely with the graver, in a firm neat style,

but rather stiff and dry. The vast number of plates executed by his hand sufficiently evince the facility with which he engraved; and though exceedingly neat, yet they are seldom highly finished.

Collaert (Hans or John), son to the foregoing, was also an excellent artist. He drew and engraved exactly in the style of his father; and was in every respect equal to him in merit. He must have been very old when he died; for his prints are dated from 1555 to 1622. He assisted his father in all his great works, and engraved besides a prodigious number of plates of various subjects. One of his best prints is Moses striking the rock, a large print, lengthwise, from Lambert Lombard. A great number of small figures are introduced into this print; and they are admirably well executed: the heads are fine, and the drawing very correct.

To COLLA'PSE. *v. a.* (*collapsus*, Lat.) To close so as that one side touches the other (*Arbuthnot*).

COLLA'PSION. *s.* (from *collapse.*) 1. The act of closing or collapsing. 2. The state of vessels closed.

CO'LLAR. *s.* (*collare*, Latin.) 1. A ring of metal put round the neck (*Dryden*). 2. The part of the harness that is fastened about the horse's neck (*Shakspeare*). 3. The part of the dress that surrounds the neck. 4. *To slip the* Collar. To get free; to escape (*Spen.*). 5. *A* Collar *of Brawn*, is the quantity bound up in one parcel.

Collar, in Roman antiquity, a sort of chain put generally round the neck of slaves that had ran away, after they were taken, with an inscription round it, intimating their being deserters, and requiring their being restored to their proper owners, &c.

Collar, in a more modern sense, an ornament consisting of a chain of gold, enamelled, frequently set with cyphers or other devices, with the badge of the order hanging at the bottom, wore by the knights of several military orders over their shoulders, on the mantle, and its figure drawn round their armories.

Thus, the collar of the order of the garter consists of SS, with roses enamelled red, with a garter enamelled blue, and the George at the bottom.

Collar (Knights of the), a military order in the republic of Venice, called also the order of St. Mark, or the medal. The doge and the senate confer this order; the knights bear no particular habit, only the collar, which the doge puts around their necks, with a medal, whereon is represented the winged lion of the republic.

Collar-beam, in carpentry, the beam that is framed across between two principal rafters.

Collar-bone. *s.* The clavicle; the bones on each side the neck (*Wiseman*).

To Co'llar. *v. a.* (from the noun.) 1. To seize by the collar; to take by the throat. 2. *To* Collar *beef*, or other meat; to roll it up, and bind it with a string or collar.

To COLLA'TE. *v. a.* (*collatum*, Latin.) 1. To compare one thing of the same kind with another (*South*). 2. To examine; if nothing be wanting. 3. To bestow; to confer (*Taylor*). 4. To place in an ecclesiastical benefice (*Atterbury*).

COLLA'TERAL. *a.* (*con* and *latus*, Lat.) 1. Side to side (*Milton*). 2. Running parallel. 3. Diffused on either side (*Milton*). 4. Those that stand equal in relation to some common ancestor (*Ayliffe*). 5. Not direct; not immediate (*Shakspeare*). 6. Concurrent (*Atterbury*).

Collateral, in a legal sense, is taken for any thing that hangeth by the side of another, whereto it relates; as a collateral assurance is that instrument which is made over and above the deed itself, for the performance of covenants, between man and man; thus called as being external, and without the nature and essence of the covenant.

COLLA'TERALLY. *ad.* 1. Side by side (*Wilkins*). 2. Indirectly (*Dryden*). 3. In collateral relation.

COLLA'TION. *s.* (*collatio*, Latin.) 1. The act of conferring or bestowing (*Ray*). 2. Comparison of one copy, or of one thing of the same kind, with another (*Grew*). 3. A repast; a treat less than a feast.

Collation, in the canon law, the giving or bestowing of a benefice on a clergyman by a bishop, who has it in his own gift or patronage. It differs from institution in this, that institution is performed by the bishop, upon the presentation of another, and collation is his own act of presentation: and it differeth from a common presentation, as it is the giving of the church to the person, and presentation is the giving or offering of the person to the church. But collation supplies the place of presentation and institution; and amounts to the same as institution where the bishop is both patron and ordinary.

Collation of seals, denotes one seal set on the same label, on the reverse of another.

COLLATI'TIOUS. *a.* (*collatitius*, Latin.) Done by the contribution of many.

COLLATIVE BENEFICES, those which are in the gift of the ordinaries, and within their own jurisdiction, in which case there need no presentation, but the ordinary collates or institutes the clerk, and sends him to the archdeacon, or other person, whose office is to induct him.

COLLA'TOR. *s.* (from *collate.*) 1. One that compares copies, or manuscripts. 2. One who presents to an ecclesiastical benefice (*Ayliffe*).

To COLLAU'D. *v. a.* (*collaudo*, Lat.) To join in praising.

CO'LLEAGUE. *s.* (*collega*, Latin.) A partner in office or employment (*Swift*).

To Colle'ague. *v. a.* To unite with (*Shakspeare*).

To COLLE'CT. *v. a.* (*collectum*, Latin.) 1. To gather together; to bring into one place (*Watts*). 2. To draw many units or numbers into one sum (*Locke*). 3. To gain from ob-

servation (*Shakspeare*). 4. To infer as a consequence; to gather from premises (*Locke*). 5. *To* COLLECT *himself.* To recover from surprise (*Shakspeare*).

COLLECT, in the liturgy of the church of England, and the mass of the Romanists, denotes a prayer accommodated to any particular day, occasion, or the like.

In the general, all the prayers in each office are called collects; either because the priest speaks in the name of the whole assembly, whose sentiments and desires he sums by the word *oremus*, let us pray, as is observed by pope Innocent III. or because those prayers are offered when the people are assembled together; which is the opinion of Pamelius on Tertullian.

The congregation itself is in some ancient authors called collect.

The popes Gelasius and Gregory are said to have been the first who established collects. Despense, a doctor of the faculty of Paris, has an express treatise on collects, their origin, antiquity, authors, &c.

COLLECTA'NEOUS. *a.* (*collectaneus*, Latin.) Gathered up together; collected.

COLLE'CTIBLE. *a.* (from *collect.*) That may be gathered from the premises by just consequences (*Brown*).

COLLE'CTION. *s.* (from *collect.*) 1. The act of gathering together. 2. The things gathered (*Addison*). 3. The act of deducing consequences (*Hooker*). 4. A consectary deduced from premises (*Hooker*).

COLLECTI'TIOUS. *a.* (*collectitius*, Lat.) Gathered up.

COLLE'CTIVE. *a.* (*collectif*, French.) 1. Gathered into one mass; aggregated; accumulative (*Watts*). 2. Employed in deducing consequences; argumentative (*Brown*). 3. A *collective* noun expresses a multitude, though itself be singular; as a *company*.

COLLE'CTIVELY. *ad.* In a general mass; in a body; not singly (*Hale*).

COLLE'CTOR. *s.* (*collector*, Latin.) 1. A gatherer; he that collects scattered things together. 2. A compiler (*Addison*). 3. A taxgatherer (*Temple*).

COLLECTOR, in electricity, is a small appendage to the prime conductor of the electrical machine, and generally consisting of pointed wires, affixed to that end of the prime conductor which stands contiguous to the glass globe, or cylinder, or other electric of the machine. Its office is to receive the electricity, whether positive or negative, from the excited electric, much more readily than the blunt end of the prime conductor would be able to receive it without that appendage. See ELECTRICITY.

COLLE'GATARY. *s.* (from *con* and *legatum*, Latin.) A person to whom is left a legacy in common with others (*Chambers*).

CO'LLEGE. *s.* (*collegium*, Latin.) 1. A community; a number of persons living by some common rule (*Dryden*). 2. A society of men set apart for learning, or religion (*Ba.*). 3. The house in which the collegians reside. 4. A *college*, in foreign universities, is a lecture read in public.

COLLEGE, an assemblage of several bodies or societies or of several persons into one society. College, among the Romans, served indifferently for those employed in the offices of religion, of government, the liberal and even mechanical arts and trades; so that, with them, the word signified what we call a corporation or company.

COLLEGE, an institution among the moderns, founded on the model of the ancient colleges. Such are the three colleges of the empire, viz. the *College of Electors, or their Deputies*, assembled in the diet of Ratisbon. *College of Princes*; the body of princes, or their deputies, at the diet of Ratisbon. *College of Cities*, is, in like manner, the body of deputies which the imperial cities sent to the diet. *College of Cardinals*, or the *Sacred College*; a body composed of the three orders of cardinals. See CARDINALS.

COLLEGE is also used for a public place endowed with certain revenues, where the several parts of learning are taught. An assemblage of several of these colleges constitute an university. The erection of colleges is part of the royal prerogative, and not to be done without the king's licence. The establishment of colleges or universities is a remarkable period in literary history. The schools in cathedrals and monasteries confined themselves chiefly to the teaching of grammar: there were only one or two masters employed in that office. But, in colleges, professors are appointed to teach all the different parts of science. See UNIVERSITY: see also ABERDEEN, CAMBRIDGE, EDINBURGH, OXFORD, &c.

COLLEGE OF CIVILIANS, commonly called Doctors Commons; a college founded by Dr. Harvey, dean of the arches, for the professors of the civil law residing in London: where usually, likewise, resides the judge of the arches of Canterbury, judge of the admiralty, of the prerogative court, &c. with other civilians; who all live, as to diet and lodging, in a collegiate manner, commoning together, whence the appellation of Doctors Commons.

COLLEGE (Gresham), or COLLEGE OF PHILOSOPHY; a college founded by sir Thomas Gresham, and endowed with the revenue of the Royal Exchange: one moiety of this endowment the founder bequeathed to the mayor and aldermen of London and their successors, in trust, that they should find four able persons to read, within the college, divinity, geometry, astronomy, and music. These are allowed each, besides lodging, 50l. per annum. The other moiety he left to the company of mercers, to find three more able persons, chosen by a committee of that company, consisting of the master and three wardens, during their office, and eight of the court of assistants, to read law, physic, and rhetoric, on the same terms; with this limitation, that the several lecturers should read in term-time, every day in the week except Sundays; in the morning in Latin, in the afternoon the same in En-

glish: but that in music to be read only in English. By 8th George III. cap. 32. the building appropriated to this college was taken down, and the excise office erected in its room. Each of the professors is allowed 50l. per annum, in lieu of the apartments, &c. relinquished by them in the college, and is permitted to marry, notwithstanding the restriction of sir Thomas Gresham's will. The lectures are now read in a room over the Royal Exchange; and the city and mercers company are required to provide a proper place for that purpose.

College of Heralds, commonly called the Heralds Office; a corporation founded by a charter of king Richard III. who granted them several privileges, as to be free from subsidies, tolls, offices, &c. They had a second charter from king Henry VI.; and a house built near Doctors Commons, by the earl of Derby, in the reign of king Henry VII. was given them by the duke of Norfolk, in the reign of queen Mary, which house was rebuilt. This college is subordinate to the earl-marshal of England. They are assistants to him in his court of chivalry, usually held in the common-hall of the college. See Herald.

College of Heralds in Scotland, consists of Lyon king at arms, six heralds, and six pursuivants, and a number of messengers. See Lyon.

College (Royal Military), was instituted in 1799, under the direction of twelve commissioners, a governor and professor of mathematics. It consists of two departments; the senior, established at High Wycombe, and the junior at Great Marlow, in Buckinghamshire, each under the care of a commandant, superintendant, and adjutant, and under the instruction of a number of masters in different branches of science. The pupils in the senior department are young officers who have received their commissions; those in the junior department, amounting to about 300, are several of them instructed at Marlow, preparatory to their reception at the Royal Military Academy at Woolwich; the remainder of them are fitted for commissions in the army. Each cadet at this institution pays 90l. per annum.

College of Physicians, a corporation of physicians in London; who, by several charters, and acts of parliament of Henry VIII. and his successors, have certain privileges, whereby no man, though a graduate in physic of any university, may, without licence under the said college-seal, practise physic, in, or within seven miles of London; with power to administer oaths, fine and imprison offenders, in that and several other particulars; to search the apothecaries shops, &c. in and about London, to see if their drugs, &c. be wholesome, and their compositions according to the form prescribed by the said college in their dispensatory.

Of this college there are at present a president, four censors, eight electors, a register, and a treasurer, chosen annually in October: the censors have, by charter, power to survey, govern, and arrest all physicians, or others practising physic, in or within seven miles of London; and to fine, amerce, and imprison them, at discretion. The number of fellows was anciently thirty, till king Charles II. increased their number to forty: and king James II. giving them a new charter, allowed the number of fellows to be enlarged so as not to exceed fourscore.

College of Physicians (Royal), in Scotland, is a corporation of physicians at Edinburgh, established by patent of Charles II. This college consists of a president, two censors, a secretary, and the ordinary society of fellows. They have similar rights and privileges with those of the English college.

College de Propaganda Fide, was founded at Rome in 1622 by Gregory XV and enriched with ample revenues. It consists of thirteen cardinals, two priests, and a secretary; and was designed for the propagation and maintenance of the Romish religion in all parts of the world. The funds of this college have been very considerably augmented by Urban VIII. and many private donations. Missionaries are supplied by this institution, together with a variety of books suited to their several appointments. Another college of the same denomination was established by Urban VIII. in 1627, in consequence of the liberality of John Baptist Viles, a Spanish nobleman. This is set apart for the instruction of those who are designed for foreign missions. It was at first committed to the care of three canons of the patriarchal churches; but ever since the year 1641 it is under the same government with the former institution.

College (Sion), was formerly a religious house, next to a spital, or hospital; and now it is a composition of both, viz. a college for the London clergy, who were incorporated in 1631, pursuant to the will of Dr. White, under the name of the President and Fellows of Sion College; and an hospital for ten poor men and as many women.

College (Veterinary), the establishment of which does honour to the present reign, reflects infinite credit on its patrons, and certainly merits the sanction and support which have been so liberally conferred upon it.

This college was founded in 1792, for the medical cure and treatment of horses, and for the purpose of instructing pupils in veterinary medicine and surgery.

Mr. St. Bel, an ingenious veterinarian, who had distinguished himself in France by his skill in the veterinary art, was appointed professor, and the institution was under the direction of a president and twenty-four governors, chosen from the nobility and gentlemen who were zealous in promoting so beneficial a plan. A forge and stabling for fifty horses, with every convenience, were built at Pancras, about two miles on the north side of London. A handsome theatre was also erected, with a museum and dissecting rooms for the purpose of giving lectures to the pupils, and teaching them practical anatomy. A medical com-

mittee of assistance was appointed, who undertook to examine the pupils, and grant them certificates when they had acquired sufficient knowledge of the art, to enable them to practise it with success.

M. St. Bel died soon after the college had been established, and was succeeded by Mr. Coleman, who has greatly contributed to the improvement of the art, by his extensive knowledge of anatomy and physiology, as well as by his attention to the pupils.

An annual subscriber of two guineas has the privilege of sending two horses to the college when sick or lame, where they receive every medical assistance that may be required, the proprietor paying only for keep. By paying twenty guineas at once, this advantage is made perpetual. For several years, parliament has annually contributed to the support of this institution, and his majesty has been pleased to grant commissions in the army to those who qualify themselves in the art, which has tended very materially to its promotion, as well as to render it respectable.

A considerable number of veterinary surgeons have been examined and approved of by the medical committee, who have granted to each a regular diploma, under which they now practise in different parts of the kingdom.

COLLE'GIAN. *a.* (from *college.*) Relating to a college; possessed by a college.

Colle'gian. *s.* (from *college.*) An inhabitant of a college; a member of a college.

COLLE'GIATE. *a.* (*collegiatus*, low Lat.) 1. Containing a college; instituted after the manner of a college (*Hooker*). 2. A *collegiate* church, was such as was built at a distance from the cathedral, wherein a number of presbyters lived together (*Ayliffe*).

Colle'giate. *s.* (from *college.*) A member of a college; an university man (*Rymer*).

CO'LLET. *s.* (Fr. from *collum*, Latin, the neck.) 1. Something that went about the neck. 2. That part of a ring in which the stone is set.

COLLE'TIA. In botany, a genus of the class pentandria, order monogynia. Corol campanulate, furnished with scale-like folds; calyxless; fruit, three-grained. One species only: a Brasilian shrub with thick spines opposite, elliptic very entire leaves; nodding, petioled flowers.

To COLLI'DE. *v. a.* (*collido*, Latin.) To beat, to dash, to knock together (*Brown*).

COLLIER (Jeremiah), an English divine. He was born at Stow Qui, in Cambridgeshire, in 1650, and educated at Caius college, where he proceeded to his degree of M.A. in 1676. On entering into orders he obtained a living in Suffolk, which he afterwards resigned, and settled in London; where he was appointed lecturer of Gray's-inn. He was silenced at the revolution for not taking the oaths, and became a zealous nonjuror He was also committed to the Tower for a libel on the new government, but was discharged without a trial. He now turned his attention to writing and translating books, some of which possess great merit; and the world is not a little indebted to him for the partial reformation which has taken place in the English drama. In 1698 he attempted to reform our theatrical entertainments, by publishing his Short View of the Immorality and Profaneness of the English Stage; which engaged him in a controversy with the wits of the time: but as Mr. Collier defended his censures not only with wit, but with learning and reason, it is allowed that the decorum observed, for the most part, by succeeding dramatic writers, has been owing to his animadversions. Some of the writers, who had been noticed for the licentiousness of their pieces, returned virulent answers to Collier's book: but Dryden, much to his credit, made his recantation, and acknowledged his fault. His Essays also, in 3 vols. 8vo. published in 1709, are very excellent, and the style is remarkably neat and easy. He next published an Historical Dictionary in 4 vols. folio, taken chiefly from Moreri; and this was followed by his Ecclesiastical History of Great Britain, in 2 vols. folio; a work of great labour, and considerable credit. In 1713 he was consecrated a bishop by Dr. Hickes, who had himself been consecrated by the deprived bishops of Norwich, Ely, and Peterborough. He died in 1726, and was buried in St. Pancras church-yard.

Co'llier. *s.* (from *coal.*) 1. A digger of coal. 2. A dealer in coal. 3. A ship that carries coal.

CO'LLIERY. *s.* (from *collier.*) 1. The place where coal is dug. 2. The coal trade.

CO'LLIFLOWER. *s.* (from capl, Sax. and *flower.*) Cauliflower.

COLLIGA'TION. *s.* (*colligatio*, Latin.) A binding together (*Brown*).

COLLIMA'TION. *s.* (from *collimo*, Lat.) Aim.

Collimation (Line of), in a telescope, is that which passes through the tube, and cuts both the focus of the eye-piece, and the centre of the object-glass.

COLLINEA'TION. *s.* (*collineo*, Latin.) The act of aiming.

COLLINS (John), an English mathematician. He was born near Oxford, in 1624, and became a clerk to Mr. Mar, an officer in the household of prince Charles. This gentleman was fond of mathematics, and under him Mr. Collins made some progress in that study. He afterwards went to sea; and in 1652, published an Introduction to Merchants' Accounts, in folio, which was reprinted, with additions, in 1665. This work was followed by others on practical mathematics; and some papers in the Transactions of the Royal Society, of which he was chosen a member. He was also made accomptant to the Royal Fishery Company; and wrote several commercial tracts. He died in November 1683.

Mr. Collins was a very useful man to the sciences, keeping up a constant correspondence with the most learned men, both at home and abroad, and promoting the publication of many valuable works, which, but for him, would never have been seen by the public; particular-

ly Dr. Barrow's optical and geometrical lectures; his abridgment of the works of Archimedes, Apollonius, and Theodosius; Branker's translation of Rhronius's algebra, with Dr. Pell's additions, &c.; which were procured by his frequent solicitations.

It was a considerable time after, that his papers were all delivered into the hands of the learned and ingenious Mr. William Jones, F.R.S. among which were found manuscripts upon mathematical subjects, of Briggs, Oughtred, Barrow, Newton, Pell, and many others. From a variety of letters from these, and many other celebrated mathematicians, it appears that Collins spared neither pains nor cost to procure what tended to promote real science: and even many of the late discoveries in physical knowledge owe their improvement to him; for while he excited some to make known every new and useful invention, he employed others to improve them. Sometimes he was peculiarly useful, by shewing where the defect was in any useful branch of science, pointing out the difficulties attending the enquiry, and at other times setting forth the advantages, and keeping up a spirit and warm desire for improvement. Mr. Collins was also as it were the register of all the new improvements made in the mathematical sciences; the magazine to which the curious had frequent recourse: in so much that he acquired the appellation of the English Mersennus. If some of his correspondents had not obliged him to conceal their communications, there could have been no dispute about the priority of the invention of a method of analysis, the honour of which evidently belongs to Newton; as appears undeniably from the papers printed in the Commercium Epistolicum D. Joannis Collins et aliorum de Analysi promota; jussu Societatis Regiæ in lucem editum, 1712; a work that was made out from the letters in the possession of our author.

COLLINS (Samuel), an English physician, who studied at Padua, and took his degree at Oxford in 1659. He wrote the Present State of Russia, 1671, 8vo. and a book of anatomy, in folio. He was censor of the college in 1707.

COLLINS (Anthony), an English writer of note. He was born near Hounslow, in Middlesex, 1676; educated first at Eton, and then at King's college, Cambridge. On leaving the university, he became a student in the Temple; but did not make the law his profession. He cultivated the acquaintance of Locke and other ingenious men. Locke left a letter to be delivered after his decease to Collins, which is full of affection and good advice. He rendered himself famous by some books against christianity, particularly one entitled, A Discourse on Freethinking, 1713, 8vo.; and a Discourse of the Grounds and Reasons of the Christian Religion, 8vo. 1724; both of these occasioned much controversy. In 1726 appeared his Scheme of literal Prophecy considered, in 8vo. which was attacked by a number of able writers, and defended by the author, who died of the stone in 1729. Besides these works, he published several others, as Priestcraft in Perfection, 1709; an historical Essay upon the 39 Articles of Religion, 1724; a philosophical Enquiry concerning human Liberty, 1717, which was answered by Dr. Samuel Clarke. Most of his other pieces were ably refuted by Dr. Leland.

COLLINS (William), an English poet; born at Chichester about 1720, and educated at Winchester school, from whence he removed to Queen's college, Oxford. In 1741, he was chosen demy of Magdalen college, where he took his degree of B.A. and, while there, published his Oriental Eclogues. About 1744 he quitted the university, and went to London, where he suffered extreme poverty. His uncle left him 2000l. which saved him from wretchedness, but he did not live to spend it. His death happened at Chichester in 1756. He had been deranged in his intellects for some time. Dr. Johnson relates, that he called upon him at Islington, and found him with a book in his hand; on taking it, out of curiosity to see what companion a man of letters had chosen, "I have but one book (says Collins), but that is the *best*." It was in fact a New Testament, such as children carry to school. His odes are very sublime, particularly that on the Passions, which is generally esteemed one of the finest odes in our language.

Indeed the poet whose career was thus short and melancholy united in his compositions the brilliancy of a vivid imagination, the correctness of a classical taste, and the touching expression of a soul susceptible to all the finer emotions. Though he was much neglected by his contemporaries, the justice of posterity, which though often tardy, is generally certain, has assigned him an exalted place among English poets.

COLLINS'S QUADRANT. See QUADRANT.

COLLINSON (Peter), an ingenious botanist, born near Kendal, in Westmoreland. In his youth he discovered a strong inclination to the study of natural history; and, in 1728, was elected a fellow of the Royal Society. He was the intimate friend of Benjamin Franklin, and received from him his first essays on electricity. He kept up a correspondence with ingenious men in every part of the world, and thereby obtained a noble collection of plants. When Linnéus was in England, he formed a close friendship with Mr. Collinson, which continued to the last. He died in 1768. (*Wat.*).

COLLINSONIA. In botany, a genus of the class diandria, order monogynia. Corol unequal, the lower lip many cleft, capillary; seed one, perfect. Two species only: one a native of North America, with yellow-purplish flowers in loose spikes: the other of Florida, with leaves more hairy than the former.

COLLI'QUABLE. *a.* (from *colliquate.*) Easily dissolved; liable to be melted (*Harvey*).

COLLI'QUAMENT. *s.* (from *colliquate.*) The substance to which any thing is reduced by being melted.

CO'LLIQUANT. *a.* (from *colliquate.*) That has the power of melting or dissolving.

To CO'LLIQUATE. *v. a.* (*colliqueo*, Lat.) To melt; to dissolve (*Boyle*).

COLLIQUA'TION. *s.* (*colliquatio*, Latin.) 1. The act of melting (*Boyle*). 2. Such a temperament or disposition of the animal fluids as proceeds from a lax compages, and wherein they flow off through the secretory glands faster than they ought (*Bacon*).

COLLI'QUATIVE. *a.* (from *colliquate*.) Melting; dissolvent (*Harvey*).

Colliquative diarrhœa. (*diarrhœa colliquativa*; from *colliqueo*, to melt or waste away.) A purging which mostly takes place in phthisis, consuming the strength of the patient very rapidly, and generally alternating with profuse perspirations, which are also termed colliquative.

COLLIQUEFA'CTION. *s.* (*colliquefacio*.) The act of melting together (*Bacon*).

COLLISEUM. See Coliseum.

COLLI'SION. *s.* (*collisio*, Latin.) 1. The act of striking two bodies together. 2. The state of being struck together; a clash (*Den.*).

Collision, in mechanics and physics, means the and meeting, mutual striking, of two or more bodies, one of which, at least, is in motion. The most simple of the problems relating to collision was that of a body proceeding to strike against another at rest, or moving before it with less velocity, or approaching towards it. Des Cartes, misled by his metaphysical principles, which had induced him to suppose that the same quantity of absolute motion always exists in the world, concluded that the sum of the motions after the impact, was equal to the sum of the motions before it. But the proposition is true only in the first and second of these cases: it is false when the two bodies meet each other; for in that case, the sum of the motions after the impact is equal to the difference of their motions before it, not to their sum. Thus Des Cartes discovered only part of the truth. In 1661, Huyghens, Wallis, and sir Christopher Wren, all discovered the true laws of percussion separately, and without any communication with each other, as has been completely proved. The basis of their solutions is, that in the mutual percussion of several bodies, the absolute quantity of motion of the centre of gravity is the same after as before the shock. Farther, when the bodies are elastic, the relative velocity is the same after as before percussion. All this, however, is upon the supposition that bodies are either perfectly hard, or perfectly elastic; but as there do not exist in nature any bodies (which we know) of either the one or the other of these kinds, the usual theories are of no service in practical mechanics. The only theory with which we are acquainted that has any pretensions to universality of application is that of Don George Juan, a Spanish philosopher: but as it is very abstruse, and cannot be described in small compass, we refer the reader to Gregory's Mechanics, book ii. chap. 5., where there is an ample account of this curious theory.

To CO'LLOCATE. *v. a.* (*colloco*, Latin.) To place; to station (*Bacon*).

COLLOCA'TION. *s.* (*collocatio*, Latin.) 1. The act of placing; disposition. 2. The state of being placed (*Bacon*).

COLLOCOCCUS. See Cordia collococcus.

COLLOCU'TION. *s.* (*collocutio*, Latin.) Conference; conversation.

To COLLO'GUE. *v. n.* To wheedle; to flatter. A low word.

CO'LLOP. *s.* (from *coal* and *op*, a rasher broiled upon coal.) 1. A small slice of meat (*Dryden*). 2. A piece of any animal (*L'Estrange*). 3. A child: in burlesque (*Shakspeare*).

COLLO'QUIAL. *a.* (from *colloquy*.) That relates to common conversation.

CO'LLOQUY. *s.* (*colloquium*, Lat.) Conference; conversation; talk (*Taylor*).

CO'LLOW. *s.* Black grime of burnt coal, or wood (*Woodward*).

COLLU'CTANCY. *s.* (*colluctor*, Latin.) Tendency to contest; opposition of nature.

COLLUCTA'TION. *s.* (*colluctatio*, Lat.) Contest; contrariety; opposition (*Woodward*).

To COLLU'DE. *v. n.* (*colludo*, Latin.) To conspire in a fraud; to act in concert.

COLLUM, in botany, the neck or upper part of the tube in a monopetalous corol.

Collum, in anatomy. See Cervix and Neck.

COLLU'SION. *s.* (*collusio*, Latin.) A deceitful compact between two or more (*Cowley*).

COLLU'SIVE. *a.* (from *collude*.) Fraudulently concerted.

COLLU'SIVELY. *ad.* In a manner fraudulently concerted.

COLLU'SORY. *a.* (*colludo*, Latin.) Carrying on fraud by a secret concert.

COLLUTHIANS, a religious sect, which rose about the beginning of the fourth century, on occasion of the indulgence shown to Arius by Alexander patriarch of Alexandria. Several people being scandalized at so much condescension, and, among the rest, Colluthus, a priest of the same city, he hence took occasion for holding separate assemblies, and by degrees proceeded to the ordination of priests, as if he had been a bishop. He was condemned by a council held at Alexandria in the year 330.

COLLUTO'RIUM. (*collutorium*, from *colluo*, to wash.) A fluid medicine which is used as a wash for the mouth.

CO'LLY. *s.* (from *coal*.) The smut of coal (*Burton*).

To Co'lly. *v. a.* To grime with coal (*Shakspeare*).

COLLYRÆ, in antiquity, small round ornaments of hair worn by women on their necks.

COLLY'RIUM. (*collyrium*, from κωλυω, to check, and ρυς, a defluxion.) Any medicine was formerly so called, which was applied with that intention. The term is now only given to fluid applications for the eyes, or eye-waters.

COLMAR, a city of France, capital of the department of Upper Rhine. Lat. 48. 5 N. Lon. 7. 27 E.

COLMARS, a town of France, in the department of the Lower Alps. Lat. 44. 7 N. Lon. 6. 35 E.

COLN, a river which rises near Clare, in Suffolk, and passing by Halstead and Colchester in Essex, empties itself into the German ocean, between Mersey island and the main land.

COLNBROOK, a town of Bucks, with a market on Wednesdays. Lat. 51. 29 N. Lon. 0. 25 W.

COLNE, a town in Lancashire, with a market on Wednesdays. Lat. 53. 50 N. Lon. 2. 5 W.

COLOBIUM, an upper garment without sleeves, worn by the ancients.

COLOCYNTHIS. (*colocynthis*, κολοκυνθις; from κωλον, the colon, and κινεω, to move; because of its great purging powers.) Coloquintida. Bitter apple. Bitter gourd. Bitter cucumber. The fruit which is the medicinal part of this plant cucumis colocynthis; foliis multifidis, pomis globosis glabris, is imported from Turkey. Its spongy membranous medulla or pith is directed for use; it has a nauseous, acrid, and intensely bitter taste; and is a powerful irritating cathartic. In doses of ten and twelve grains it operates with great vehemence, frequently producing violent gripes, bloody stools, and disordering the whole system. It is recommended in various complaints, as worms, mania, dropsy, epilepsy, &c.; but is seldom resorted to, except where other more mild remedies have been used without success, and then only in the form of the extractum colocynthidis compositum and the pilulæ ex colocynthide cum aloe of the pharmacopœias. See CUCUMIS.

COLOGNE, (anciently Colonia Agripp.) an ancient city of Germany, capital of an electorate of the same name, with a bishop's see and a university. It contains 10 collegiate, and 19 parochial churches, 4 abbeys, 17 monasteries, 40 nunneries, and about 50 chapels. Cologne is the birth-place of Rubens. It is fortified in the ancient manner, and is a free imperial city: although the elector has a palace here, he has not the liberty of staying in it for many days together. The inhabitants are generally Roman catholics, but there are some protestants, who have their public worship at Mulheim, three miles from the city. Cologne is built on the borders of the Rhine. Lat. 50 55 N. Lon. 7. 10 E.

COLOGNE, an electorate of Germany, in the circle of Lower Rhine, bounded on the N by the duchy of Cleves and Guelderland, on the E by the duchy of Berg, on the S by the archbishopric of Treves, and on the W by the duchy of Juliers. The elector is archchancellor of the empire for Italy.

COLOGNE EARTH, a substance used in painting, much approaching to amber in its structure, and of a deep brown. It has generally been esteemed a genuine earth, but has been discovered to contain a great deal of vegetable matter, and, indeed, is a very singular substance. It is dug in Germany and France: the quantities consumed in painting in London are brought from Cologne, where it is found very plentifully: but our own kingdom is not without it, it being found near Birmingham, and on the Mendip-hills, in Somersetshire; but what has been yet found there is not so pure or fine as that imported from Cologne.

COLOMBA. (*colomba.*) Columbo. Calomba. Colombo. Calumba. The root so called is imported from Colomba in Ceylon, in circular, brown knobs, wrinkled on their outer surface, yellowish within, and consisting of cortical, woody, and medullary laminæ. Its smell is aromatic; its taste pungent and nauseously bitter. It is much esteemed as a tonic in dyspeptic and bilious cases. A tincture is directed by the colleges.

COLOMBO, or COLUMBO, a town on the E. side of the island of Ceylon, in the East Indies. It belongs to the Dutch. Lat. 7. 10 N. Lon. 80. 25 E.

COLOMNA (Fabio), a very learned botanist, born at Naples about the year 1567. He became skilled in the languages, in music, designing, painting, and the mathematics; and died about the middle of the 17th century. He wrote, 1. Φυτοβασανος, seu Plantarum aliquot (ac piscium) historia. 2. Minus cognitarum rariorumque stirpium εκφρασις; itemque de aquatilibus, aliisque nonnullis animalibus, libellus; and other works.

COLON. (*colon*, κωλον from; κοιλος, hollow; because it is generally found hollow in the dead body.) The second portion of the large intestines. See INTESTINES, and ANATOMY.

COLON, in grammar, a point or character marked thus (:), shewing the preceding sentence to be perfect or entire; only that some remark, farther illustration, or other matter connected therewith, is subjoined. See PUNCTUATION.

COLONEL, in military matters, the commander in chief of a regiment, whether horse, foot, or dragoons. Skinner derives the word from colony; being of opinion, the chiefs of colonies, called coloniales, might give the name to chiefs of forces. In the French and Spanish armies, colonel is confined to the infantry and dragoons: the commanding officer of a regiment of horse they usually call mestre de camp. Formerly, instead of colonel, the French used the word coronel; and this old spelling comes nearer to our common way of pronouncing the word colonel. A colonel may put an officer of his regiment in arrest, but must acquaint the general with it. He is not allowed a guard, only a sentry from the quarter-guard.

Colonel-Lieutenant, he who commands a regiment of guards, whereof the king, prince, or other person of the first eminence, is colonel. These colonel-lieutenants have always a colonel's commission, and are usually general officers.

Lieutenant-Colonel, the second officer in a regiment, who is at the head of the captains, and commands in the absence of the colonel.

CO'LONELSHIP. s. (from *colonel.*) The office or character of colonel (*Swift*).

COLONIA AGRIPPINA UBIORUM, in ancient geography, a town seated on the banks of the Rhine, now Cologne.

To CO'LONISE. *v. a.* (from *colony.*) To plant with inhabitants (*Howel*).

COLONNADE, in architecture, a peristyle of a circular figure; or a series of columns disposed in a circle, and insulated within side. A *Polystyle Colonnade,* is that whose number of columns is too great to be taken in by the eye at a single view. Such is the colonnade of the palace of St. Peter's at Rome, consisting of 284 columns of the Doric order, each above four feet and an half diameter, all in Tiburtine marble.

COLONY, a company of people transplanted into a remote province in order to cultivate and inhabit it. We may distinguish three kinds of colonies. 1. Those serving to ease the inhabitants of a country, where the people are become too numerous. 2. Those established by victorious princes in the middle of vanquished nations, to keep them in awe and obedience. 3. *Colonies of commerce*; which may be so called, because, in effect, it is trade that is the sole occasion and object of their being established. Of the last kind of colonies we must chiefly reckon those established by the British, French, Spanish, Portuguese, &c. within the two last centuries, and which they continue still to establish in several parts of Asia, Africa, America, and the islands in the South seas; either to keep up a regular commerce with the natives, or to cultivate the ground, by planting sugar canes, indigo, tobacco, and other commodities.

On the subject of colonies, a subject far too copious to be properly discussed within the narrow limits of an article in a general dictionary, we would refer to Smith's Wealth of Nations, b. iv. chap. 7.; Robertson's Hist. of America, vol. iii.; Brougham on Colonial Policy; and Talleyrand's Essay on Colonies.

COLOPHON, an ancient town of Asia Minor, now Belvidere.

COLOPHO'NIA. (*colophonia,* κολοφωνια, the city from whence it was first brought.) Resina nigra. The black resin which remains in the retort after distilling the common resin with a strong fire.

COLOQUINTIDA. See COLOCYNTHIS.

CO'LORATE. *a.* (*coloratus,* Latin.) Coloured; dyed; stained with some colour (*Ray*).

COLORA'TION. *s.* (*coloro,* Latin.) 1. The art or practice of colouring (*Bacon*). 2. The state of being coloured (*Bacon*).

COLORATURA, in music, any variations or extemporary embellishments which serve to render the piece agreeable.

COLORI'FICK. *a.* (*colorificus,* Lat.) That has the power of producing colours (*Newton*).

COLORIFIC EARTHS, in oryctology, a class of earths in the system of Kirwan characterised by the stain or tinct they leave upon the fingers. It consists of four families, red, yellow, black and green. The red colorific earth of Kirwan is the reddle or red chalk, *roethel stern*; *crayon rouge,* Brock: its hue is that of a dark cochineal, midway between brick and blood-red. It differs from red ochres merely by containing more argil. The red colour proceeds from oxygenation and the absence of acid. The yellow, gellebarde, Leske, 0.1098 is of an ochre yellow, and chiefly differs from common yellow ochres by containing, like the red, a greater proportion of argil; the more iron it holds, for the most part the deeper its yellow. The black, black chalk, schwartz kreide, 3,792, pierre noire of Brisson, is of a greyish black colour, and contains a little sulphuric acid. The green colorific earth, Leske, 0.1013, is of a greyish-green colour; found generally in lumps in the cavities of other stones, or externally investing them. It consists of silex, argil, iron not much oxygenated, and oxyd of nickel, whence the green hue is obtained, independently of a certain portion of water. Kirwan's Elem. of Mineralogy, vol. i. See also the article MINERALOGY in this work.

COLORNO, a town of Parma, in Italy, 8 miles from Parma. Lat. 44. 54 N. Lon. 10. 22 E.

COLOSSIANS (Epistle to the), in biblical literature, a canonical epistle of the New Testament. Dr. Doddridge is of opinion (Family Expositor, vol. v.) that Paul wrote this epistle at the same time with that to the Ephesians, and that they were both sent together by Tychicus and Onesimus, towards the close of Paul's first imprisonment at Rome, which was about the year of our Lord 63, or the ninth of the emperor Nero.

Colosse was a large and opulent city of Phrygia in Asia Minor, and stood not far from Laodicea. It has been lately a prevailing opinion that the christians at Colosse and Laodicea were not converted by Paul; but Dr. Lardner has written an express dissertation to prove that the church of Colosse was of that apostle's planting, and that the christians there were his friends, disciples, and converts.

The Colossians appear from this epistle to have borne an honourable character for their piety and zeal for the gospel; but were in some danger of being drawn aside by the subtleties of the heathen philosophers, and the insinuations of some Jewish zealots, who insisted upon the necessity of conforming to the Mosaic law. Accordingly, the grand design of this epistle is to excite the Colossians by the most persuasive arguments to a temper and behaviour worthy their sacred character, and to secure them from the influence of those Pagan sophists or Jewish bigots, who would seduce them from the purity of the Christian faith. For arguments in proof of the authenticity of this epistle, deduced from its coincidences with the Acts of the Apostles, see Paley's Horæ Paulinæ, pp. 278—292.

COLOSSUS, a statue of enormous or gigantic size. The most eminent of this kind was the Colossus of Rhodes; a statue of Apollo, so high, that ships passed with full sails betwixt its legs. It was the workmanship of Chares, a disciple of Lysippus; who spent twelve years in making it: it was at length

overthrown by an earthquake, after having stood 1360 years. Its height was six score and six feet: there were few people could fathom its thumb.

The Colossus lay neglected on the ground 894 years, when, about the year of our Lord 672, Moawyas, the 6th caliph or emperor of the Saracens, made himself master of Rhodes, and afterwards sold their statue, reduced to fragments, to a Jewish merchant, who loaded 900 camels with the metal, so that, allowing 800 pounds weight for each load, the brass of the Colossus, after the diminution which it had sustained by rust, and probably by theft, amounted to 720 thousand pounds weight. The basis that supported it was of a triangular figure: its extremities were sustained by sixty pillars of marble. There was a winding staircase to go up to the top of it; from whence one might discover Syria, and the ships that went to Egypt, in a great looking-glass that was hung about the neck of the statue. This enormous statue was not the only one that attracted attention in the city of Rhodes. Pliny reckons 100 other colossuses not so large, which rose majestically in its different quarters.

COLOSSE'AN. *a.* (*colosseus*, Lat.) Giantlike.

COLOSWAR, a town of Transylvania, where the senates have their meetings, 250 miles E. by S. of Vienna. Lat. 46. 53 N. Lon. 23. 15 E.

CO'LOUR. *s.* (*color*, Latin.) 1. The appearance of bodies to the eye only; hue; die (*Newton*). 2. The appearance of blood in the face (*Dryden*). 3. The tint of the painter (*Pope*). 4. The representation of any thing superficially examined (*Swift*). 5. Concealment; palliation (*K. Charles*). 6. Appearance; false show (*Knolles*). 7. Kind; species; character (*Shakspeare*). 8. In the plural, a standard; an ensign of war (*Knolles*).

To CO'LOUR. *v. a.* (*coloro*, Latin.) 1. To mark with some hue, or die (*Newton*). 2. To palliate; to excuse (*Raleigh*). 3. To make plausible (*Addison*).

To CO'LOUR. *v. n.* To blush. A low word.

COLOUR, in natural philosophy, that property of bodies which affects the sight only; or that property possessed by the elementary rays of light, separated by any means whatever, of exciting in us different sensations according to their different refrangibility. Thus colour may be considered in two respects, as it regards bodies in general, and as it is produced by solar light.

Before the time of sir I. Newton, the notions concerning colour were very vague and wild. The Pythagoreans called colour the superficies of bodies: Plato said that it was a flame issuing from them: according to Zeno, it was the first configuration of matter: and Aristotle said it was that which made bodies actually transparent. Descartes accounted colour a modification of light, and he imagined that the difference of colour proceeds from the prevalence of the direct or rotatory motion of the particles of light. Grimaldi, Dechales, and many others, imagined that the differences of colour depended upon the quick or slow vibrations of a certain elastic medium with which the universe is filled. Rohault conceived, that the different colours were made by the rays of light entering the eye at different angles with respect to the optic axis. And Dr. Hooke imagined that colour is caused by the sensation of the oblique or uneven pulses of light; which being capable of no more than two varieties, he concluded there could be no more than two primary colours.

Natural philosophers were formerly of opinion, that the solar light was simple and uniform, without any difference or variety in its parts, and that the different colours of objects were made by refraction, reflection, or shadows. But Newton taught them the errors of their former opinions; he shewed them to dissect a single ray of light with the minutest precision, and demonstrated that every ray was itself a composition of several rays all of different colours, each of which when separate held to its own nature, simple and unchanged by every experiment that could be tried upon it. Or to be more particular, light is not all similar and homogenial, but compounded of heterogenial and dissimilar rays, some of which in like instances being more refrangible, and others less refrangible; and those which are most refrangible are also most reflexible; and according as they differ in refrangibility and reflexibility, they are endowed with the power of exciting in us sensations of different colours.

SECT. I. *Theory of Light and Colours.*

Sir Isaac Newton's theory of light and colours is striking and beautiful in itself, and deduced from clear and decisive experiments, and may be almost said to demonstrate clearly,

1st, That lights which differ in colour, differ also in degrees of refrangibility.

2d, That the light of the sun, notwithstanding its uniform appearance, consists of rays differently refrangible.

3d, That those rays which are more refrangible than others, are also more reflexible.

4th, That as the rays of light differ in degrees of refrangibility and reflexibility, so they also differ in their disposition to exhibit this or that particular colour; and that colours are not qualifications of light derived from refractions or reflections of natural bodies, as was generally believed, but original and connate properties, which are different in different rays, some rays being disposed to exhibit a red colour and no other, and some a green and no other, and so of the rest of the prismatic colours.

5th, That the light of the sun consists of violet-making, indigo-making, blue-making, green-making, yellow-making, orange-making, and red-making rays; and all of these are different in their degrees of refrangibility and reflexibility; for the rays which produce red colours are the least refrangible, and those that make the violet the most; and the rest are more or less refrangible as they approach either of these extremes, in the order already mentioned: that is, orange is least refrangible next to red, yellow next to orange, and so on; so that to the same degree of refrangibility there ever belongs the same colour, and to the same colour the same degree of refrangibility.

6th, Every homogeneal ray, considered apart, is refracted according to one and the same rule, so that its sine of incidence is to its sine of refraction in a given ratio; that is, every different coloured ray has a different ratio belonging to it.

7th, The species of colour, and degree of re-

frangibility and reflexibility, proper to any particular sort of rays, is not mùtable by reflection or refraction from natural bodies, nor by any other cause that has been yet observed. When any one kind of rays has been separated from those of other kinds, it has obstinately retained its colours, notwithstanding all endeavours to bring about a change.

8th, Yet seeming transmutations of colours may be made, where there is any mixture of divers sorts of rays; for, in such mixtures, the component colours appear not, but, by their mutually alloying each other, constitute an intermediate colour.

9th, There are therefore two sorts of colour, the one original and simple, the other compounded of these; and all the colours in the universe are either the colours of homogeneal, simple light, or compounded of these mixed together in certain proportions. The colours of simple light are, as we observed before, violet, indigo, blue, green, yellow, orange, and red, together with an indefinite variety of intermediate gradations. The colours of compounded light are differently compounded of these simple rays, mixed in various proportions: thus a mixture of yellow-making and blue-making rays exhibits a green colour, and a mixture of red and yellow makes an orange; and in any colour the same in specie with the primary ones may be produced by the composition of the two colours next adjacent in the series of colours generated by the prism, whereof the one is next more refrangible, and the other next less refrangible. But this is not the case with those which are situated at too great a distance; orange and indigo do not produce the intermediate green, nor scarlet and green the intermediate yellow.

10th, The most surprising and wonderful composition of light is that of whiteness; there is no one sort of rays which can alone exhibit that colour: it is ever compounded, and to its composition all the aforesaid primary colours are requisite.

11th, As whiteness is produced by a copious reflection of rays of all sorts of colours, when there is a due proportion in the mixture; so, on the contrary, blackness is produced by a suffocation and absorption of the incident light, which being stopped and suppressed in the black body, is not reflected outward, but reflected and refracted within the body till it be stifled and lost.

Newton's method of accounting for the different colours of bodies, from their reflecting this or that kind of rays most copiously, is so easy and natural, that his system quickly overcame all objections, and to this day continues to be almost universally believed. It is now commonly acknowledged, that the light of the sun, which to us seems perfectly homogeneal and white, is composed of no fewer than seven different colours, viz. red, orange, yellow, green, blue, purple, and violet or indigo. A body which appears of a red colour, hath the property of reflecting the red rays more powerfully than any of the others; and so of the orange, yellow, green, &c. A body which is of a black colour, instead of reflecting, absorbs all or the greatest part of the rays that fall upon it; and, on the contrary, a body which appears white, reflects the greatest part of the rays indiscriminately, without separating the one from the other.

Sect. II. *Of the Separation of the original Rays of Light, by Reflection or Transmission, but depending on the Thickness of the Medium upon which they are incident.*

The foundation of a rational theory being laid, it next became natural to inquire by what peculiar mechanism in the structure of each particular body, it was fitted to reflect one kind of rays more than another. This sir I. Newton attributes to the density of these bodies. This subject however is not so clear as the preceding; for the present theory suggests many doubts to every inquisitive mind, and is allowed by all to be attended with difficulties. There are no optical experiments, however, in which sir I. Newton seems to have taken more pains than those relating to the rings of colours which appear in thin plates, and which we now propose to explain. In all his observations and investigations concerning them, he discovers the greatest sagacity, both as a philosopher and a mathematician.

The bubbles which children blow with a mixture of soap and water were observed by Dr. Hooke to exhibit various colours according to their thinness, and that when they have a considerable degree of thickness they appear colourless; from this the present theory has taken its rise. It is thus that things overlooked by the rest of mankind, are often the most fertile in suggesting hints to those who are habituated to reflection.

Sir I. Newton blew up a large bubble from a strong mixture of soap and water, and set himself attentively to consider the different changes of colour it underwent, from its enlargement to its dissolution. He in general perceived that the thinner the plate of water which composed the sides of the bubble, the more it reflected the violet colour ray; and that in proportion as the sides of the bubble were more thick and dense, the more they reflected the red: he therefore was induced to believe, that the colours of all bodies proceeded from the thickness and density of the little transparent plates of which they are composed. To bring this opinion nearer to certainty, it was necessary to measure the thickness of the plate of water which composed the bubble; but this was a matter of great difficulty, as the bubble was of itself of too transient a nature to undergo the necessary experiments.

Our philosopher, ever fertile in expedients, recollected having observed, that as two prisms were compressed hard together, in order to make their sides (which happened to be a little convex) touch one another, they were both as perfectly transparent in the place of contact as if they had been but one piece of glass; but that round the point of contact, where the glasses were a little separated from each other, rings of different colours appeared.

To observe more accurately the order of the colours produced in this manner, he placed a glass lens, whose convexity was very small, upon a plain glass. Now it is evident, that those would only touch at one particular point; and therefore, at all other places between the adjacent surfaces, a thin plate of air was interposed, whose thickness increased in a certain ratio, according to the distance from the point of contact.

He pressed these glasses slowly together, by which means the colours very soon emerged, and appeared distinct to a considerable distance; next to the pellucid central spot made by the contact of the glasses, succeeded blue, white, yellow and red. The blue was very little in quantity, nor could he discern any violet in it; but the yellow and red were very copious, extending about as far

as the white, and four or five times as far as the blue. The next circuit immediately surrounding these consisted of violet, blue, green, yellow, and red; all these were very copious except the green, which was very little in quantity, and seemed more faint and dilute than the other colours. The third circle of colours was purple, blue, green, yellow, and red; in this the purple was more reddish than the violet in the former circuit, and the green was more conspicuous, being as bright and copious as any of the other colours, except the yellow; the red was also somewhat faded. The fourth circle consisted of green and red; the green was copious and lively, inclining on one side to blue, on the other to yellow, but there was neither violet, blue, nor yellow; and the red was very imperfect and dirty. Each outer circuit or ring was more obscure than those within, like the circular waves upon a disturbed sheet of water, till they at last ended in perfect whiteness.

As the colours were thus found to vary according to the different distances of the glass plates from each other, sir Isaac judged that they proceeded from the different thickness of the plate of air, intercepted between the glasses; and that this plate was by the mere circumstance of thinness or thickness disposed to reflect or transmit this or that particular colour; from whence he concluded, as before observed, that the colours of all natural bodies depended on their component particles. He also constructed a table, wherein the thickness of a plate, necessary to reflect any particular colour, was expressed in parts of an inch, divided into 1,000,000 parts.

It has been already observed, that the thin plates, made use of in the different experiments, reflected some kinds of rays in particular parts, and transmitted others in the same parts. Hence the coloured rings appeared variously disposed, according as they were viewed by reflected or transmitted light; that is, according as the plates were or were not held up between the eye and the window. That we may understand this better, the following table has been formed. On one side are mentioned the colours appearing on the plates by reflected light, and on the other those which are perceptible when the glasses are held between the eye and the window. The centre, when the glasses are in full contact, is perfectly transparent; this spot therefore, when viewed by reflected light, appears black, because it transmits all the rays; and for the same reason it appears white, when viewed by transmitted light.

Colours by reflected light.	*Colours by transmitted light.*
Black	White
Blue	Yellowish-red
White	Black
Yellow	Violet
Red	Blue
Violet	White
Blue	Yellow
Green	Red
Yellow	Violet
Red	Blue
Purple	Green
Blue	Yellow
Green	
Yellow	Red
Red	Blueish-green
Green	Red
Red	Blueish-green
Greenish-blue	Red
Red	

In comparing the rings produced by transmitted with those produced by reflected light, the white is found opposed to the black, the red to the blue, the yellow to the violet, and the green to a colour composed of red and violet; in other words, the parts of the glass that when looked at are white, appear black on looking through the glass; and on the contrary, those which appear black in the first instance, appear white in the second; and so of the other colours. Dr. T. Young has contrived an apparatus for exhibiting and measuring these thin rings and plates; a description of which may be seen in Nicholson's Journal, vol. iii. p. 283. Newton has shewn, that the rays of any particular colour are disposed to be reflected, when the thicknesses of the plate of air are as the numbers 1, 3, 5, 7, 9, 11, &c. and that the same rays are disposed to be transmitted at the intermediate thicknesses, which are as the numbers 0, 2, 4, 6, 8, 10, &c.

The places of reflection or transmission of the several colours in a series, are so near each other, that the colours dilute each other by mixture; whence the number of series, in the open daylight, seldom exceeds 7 or 8. But if the system be viewed through a prism, by which means the rings of various colours are separated, according to their refrangibility, they may be seen on that side towards which the refraction is made, so numerous that it is impossible to count them. Or, if in a dark chamber the sun's light be separated into its original rays, by a prism, and a ray of one uncompounded colour be received upon the two glasses, the number of circles will become very numerous, and both the reflected and transmitted light will remain of the same colour as the original incident ray. This experiment shews, that in any series, the circles formed by the less refrangible rays exceed, in magnitude, those which are formed by the more refrangible; and, consequently, that in any series, the more refrangible rays are reflected at less thicknesses than those which are less refrangible.

If we apply water to the edges of the glass, it will be attracted between them; and, filling all the intercedent space, it will become a thin plate of the same dimensions as that which before was constituted of air: in this case, the circular rings grow less, and the colours fainter, but not varied in species. They become contracted in diameter, nearly in proportion of 7 to 8, and consequently, the intervals of the glasses, at similar circles, as caused by these two mediums, are as about 3 to 4; that is, as the sines of refraction out of water into air.

We have already spoken of the variety of colours produced by bubbles blown in soap-water: but as these colours are commonly too much agitated by the external air to admit of any certain observation, it is necessary to cover the bubble with a clear glass, in which situation the following appearances take place: the colours emerge from the top of the bubble, and as it grows thinner, by the subsidence of the water, they dilate into rings parallel to the horizon, which descend slowly, and vanish successively, at the bottom. This emergence continues till the water at the upper part of the bubble becomes too thin to reflect the light, at which time a circle of an intense blackness appears at the top, which slowly dilates, sometimes to three quarters of an inch in breadth, before the bubble breaks. Reckoning from the black central spot, the reflected colours are the same, in succession and quality, as those produced by the aforementioned plate of air; and the ap-

pearance of the bubble, if viewed by transmitted light, is similar to that of the plate of air in like circumstances.

If we take very thin plates of talc, or Muscovy glass, that exhibit these colours; then, by wetting the plates, the colours remain as before, but become more faint and languid, especially when wetted on the under side. So that the thickness of any plate, requisite to produce any colour, seems to depend only on the density of the plate, and not on the density of the inclosing medium. But the colours are more vivid as their densities are different.

If two pieces of plate-glass, or even common glass, be previously wiped, and then rubbed together, they will soon adhere, with a considerable degree of force, and exhibit various ranges of colours, much broader than those obtained by lenses. One of the most remarkable circumstances attending this method of making the experiment, is the facility with which the colours may be removed, or even made to disappear, by heats too low to separate the glasses. A touch of the finger immediately causes the irregular rings of colours to contract towards their centre in the part touched.

These experiments render it evident, that the colours of bodies depend, in some degree, upon the thickness and density of the particles that compose them. Hence, if the density, or size of the particles, in the surface of a body, be changed, the colour is likewise changed. When the thickness of the particles of a body is such, that one sort of light, or one sort of colour, is reflected; another light, or other colours, will be transmitted; and therefore the body will appear of the first colour.

There is a certain determinate thickness which seems to be necessary in a plate of water, for example, in order to reflect a particular colour, and a different thickness to make it reflect any other colour; and in general, that a less thickness is necessary to reflect the most refrangible rays, as violet and indigo, than those which are least refrangible, as the red and orange-coloured rays. The particles of bodies reflect rays of one colour, and transmit those of another: and this is the ground of all their colours.

SECT. III. *Of the transient State into which a Ray of Light is put, in its Passage through any refracting Surface, which, in the Progress of the Ray, returns at equal Intervals; and disposes the Ray, at every Return, to be transmitted, and, between the Returns, to be reflected to it.*

Sir I. Newton, in order to account for the intervals of the coloured rings in these thin plates, and also all other cases of the reflection or transmission of light, advances an hypothesis; but, like a wise and cautious philosopher, he professes not to lay much stress upon it, though he seems not to entertain any suspicion of its being fallacious. Indeed, it seems to be a kind of fair inference from the experiments we have been describing. The hypothesis is this: that every ray of light is, at its first emission from the luminous body, put into a transient state or constitution, which, in its progress, returns at equal intervals, disposing it, at every return, to be easily transmitted into any refracting surface it may meet with; whereas in the intervals between these returns, it is disposed to be easily reflected; so that, upon the arrival of a number of rays of light at the surface of every medium, those of them in which they were disposed to be transmitted easily would pass the interval between the two mediums; and those which were in a contrary state, would be reflected; on which account, some light is generally reflected, and some transmitted, at every different surface on which it falls. Those states into which the rays of light are put, he calls fits of easy reflection and transmission. This hypothesis, however, is not without difficulties, and must, therefore, be received with caution, as it was proposed, till it shall be either confirmed or confuted by experiment, and a new theory substituted in its stead.

When we are brought, as it were, to the confines of material nature, we must expect to meet with some confusion and darkness in our explanations. There are barriers to our knowledge, which cannot be passed by any force of human faculties. Sir I. Newton, the legislator of philosophers, expressed, under the form of conjectures or questions, those things which he was unable satisfactorily to resolve; avoiding rash assertions, which are so fondly taken up by those who wish to gain a momentary reputation.

SECT. IV. *Of the Permanent Colours of Natural Bodies, and of the Analogy between them and the Colours of thin transparent Plates.*

It has already been stated that the colours of natural bodies consist in a disposition to reflect one sort of rays more copiously than another; and that other bodies are of a different colour, because they reflect rays of a different kind. So that if light consisted only of one kind of rays, there could be only one colour in the world; nor would it be possible, by refractions and reflections, to produce a new one. Thus, in some bodies, all the rays are extinguished but the red-making; and when they are reflected to our eyes, they excite in us the idea of red; and thence we say, that such a piece of cloth, &c. is red; attributing that only to the cloth or wood, which more particularly arises from the light which dresses them in their various beauty. Thus the ruby absorbs the green, the blue, and the violet; but reflects the red-making rays to our eye, with all their prismatic lustre. The amethyst imbibes the stronger rays, and gives back the violet with milder brightness. The jonquil gives us only yellow, and the hyacinth its vivid blue. Every coloured object may be thus regarded as a partial divider of the rays, separating one or more colours, and confounding all the others.

Those surfaces of transparent bodies, which have the greatest refracting power, reflect the greatest quantity of light. In other words, bodies, by which the light is more refracted, do likewise more strongly reflect it. Diamonds, which refract the light very strongly, give it, in proportion, a stronger reflection: and hence proceed the vivacity of their colours, and their sparkling effect.

We shall perceive the analogy between refraction and reflection, by considering that the most refractive medium totally reflects the rays of light, at certain degrees of incidence. But the truth of the proposition further appears, by observing the transparent bodies, such as air, water, oil, glass, island crystal, white transparent arsenic, and diamond, have a stronger or weaker reflection, according to the greater or less refractive powers of the mediums that are contiguous to them. Thus at the confine of air and sal gem, it is stronger than at the confine of air and water; and still stronger between common air and glass; still more so between air and a diamond. If any of these be immersed in water, its reflection becomes weaker than before; and it is weaker still, if it be immersed in liquors of a greater refractive power.

If water be divided into two parts, by any imaginary surface, there is no reflection at the confine of those two parts; and for the same reason, there can be no sensible reflection in the confine of the two glasses of equal density. The reason, therefore, why all pellucid mediums have no sensible reflection but at their external surfaces, where they are contiguous to mediums of different densities, is, that their contiguous parts have precisely the same degree of density.

The least parts of all bodies, though seemingly void of transparency, when viewed in the gross, will be found, if taken separately, to be, in some measure, transparent: and the opacity arises from the multitude of reflections caused in their internal parts. This observation will be easily granted by those who have been conversant with microscopes; for there they are found to be, for the most part, transparent. Nothing seems more opaque, and free from transparency, than the clothes we wear. Yet let us only examine one of the woollen hairs that go into its composition with a microscope, and we shall find it to be nearly transparent. Gold in the mass lets no light pass through it; but if beaten out extremely thin, we shall then see that its parts are transparent, like other bodies. If held over a hole, in a darkened window, it will appear of a greenish hue. If gold be composed of transparent parts, we may surely conclude the same of other bodies; and, indeed, very few are to be found, in which, if reduced to sufficient thinness, and applied to the hole, a degree of transparency is not manifest.

It now becomes necessary, since light finds a free passage through the least particles, to inquire what renders them opaque; and this, by sir I. Newton, is attributed to the multitude of reflections and refractions which take place in the interior parts; there being, between the parts of opaque or coloured bodies, a number of spaces, filled with mediums of a different density from that of the body, as water between the tinging corpuscles with which any liquor is impregnated; air between the aqueous globules that constitute clouds and mists, &c. These spaces cannot be traversed by light, without refracting or reflecting it in various ways, by which it is prevented from passing on in a straight line, which it would do if the parts were continuous, without any such interstices between them; for we have already learned, that reflections are only made at the superficies of mediums of different densities. The opacity of a body arises, therefore, from the discontinuity of its particles, and the different density of the intervening mediums, and the particles which compose them.

This idea of opacity is greatly confirmed, by considering that opaque bodies become transparent by filling up the pores with any substance of nearly the same density with their parts. Thus when paper is wet with oil or water, or when linen cloth is dipped in water, oiled, or varnished, or the oculus mundi steeped in water, &c. they become more transparent than they were before. As filling the pores of an opaque body makes it transparent, so, on the other hand, evacuating the pores of a transparent body, or separating its parts, renders it opaque; as salts, or wet paper, by being dried; horn, by being scraped; glass, by being reduced to powder, or otherwise flawed; turpentine, by being stirred about with water, till they mix imperfectly; and water, by being formed into many small bubbles, either in the form of froth, or, by shaking it together with oil of turpentine, or some other convenient liquor, with which it will not combine.

It is plain then, that it is in homogeneity we are to seek for the cause of transparency. If there be many pores in a body, and these be filled with a matter differing much in density from the body itself, the light will meet with a thousand refractions and reflections in the internal parts, and will thus be utterly extinguished.

But the parts of bodies, and their interstices, must not be less than some definite size, to become opaque and coloured. For the most opaque bodies, if their parts be sufficiently divided, as metals, by being dissolved in acid menstrua, &c. become perfectly transparent. The black spot, near the point of contact of the two plates of glass, it has been observed, transmitted the whole light where the glasses did not absolutely touch; and the reflection at the thinnest part of the soap-bubble was so insensible as to make that part appear intensely black, by the want of reflected light.

It is on these accounts that water, salt, glass, stones, &c. are transparent; for, from many considerations, they seem to be as full of pores as other bodies are, yet their particles and pores are too small to cause reflection in their common states.

The transparent parts of bodies, according to their several sizes, must reflect rays of one colour, and transmit those of others, on the same principles that thin plates or bubbles do reflect or transmit these rays; and this seems to be the ground of all their colours. That they do so is plain from various observations; and it is on these principles you may explain the variety of colours seen in some silks, on pigeons' necks, peacocks' tails, and the feathers of other finely coloured birds. If the eye be fixed on a pigeon's neck, and both be kept at rest, only one colour is observable: but if either moves, especially the latter, a different colour may be seen. Shady silks are woven, with threads of different colours; one arranged longitudinally, the other transversely; and as the greater or less proportion of either of these appears, so one or the other of the colours will prevail. Wet these double coloured objects, dip the variegated feather in water, or the changeable silk in oil, their reflections will be less vivid, and they will return but one uniform shade of colouring. The skin of the chameleon is transparent, its ground being between a pale red and yellow, coloured with a number of small smooth protuberances of a cold blueish colour. It is endowed with a faculty of blowing up or contracting its skin at will. This causes the different colours, in appearance, to vary: it therefore sometimes appears reddish, at others blue: the yellow rays of the ground, occasionally mixing with the blue of the protuberances, produce the idea of green; and when placed on a red or yellow substance, its natural colours are unavoidably heightened.

From various phenomena it is evident, that a great proportion of the fainter coloured rays are stopped in their passage through the atmosphere, and are thence reflected upon other bodies; while the red and orange rays are transmitted to greater distances. This circumstance explains the blue shadows of bodies, the blue colour of the sky, and the red colour of the clouds, when the sun is near the horizon.

At particular times, when the sky is clear and serene, in the morning and the evening, the shadows cast from opaque bodies have been observed

to be tinged with blue and green. This circumstance naturally results from the minute particles of the atmosphere reflecting the delicate and most refrangible rays, the blue and violet, for instance, which occasions a predominance of these hues.

The blueness of the sky is accounted for on the same principles; namely, the copious reflection of the blue rays, by the atmosphere, which produces the effect of an arch of that colour, all around us. This is occasionally diversified by the greater density of the vapours, which reflect the stronger rays. The coloured clouds, in particular, which appear towards the morning and evening, when the sun is in or near the horizon, are to be attributed to the same cause. The rays of light traversing a vast extent of atmosphere; the fainter and more delicate rays, as the blue and violet, are detached by repeated reflections of the atmospheric particles; and the stronger rays, as the red, the orange, &c. are permitted to proceed, and reach the clouds, from whence they are reflected. Agreeable to this theory, we may observe, that the sun's horizontal light is sometimes so deeply tinctured with the red, that objects illuminated by it frequently appear of a bright orange, and even red. It is observable, that the clouds do not, in common, assume their brighter dyes till the sun is some minutes set, and that they pass from yellow to a flaming gold colour; and thence, by degrees, to red, which becomes deeper and deeper, till the sun leaves them altogether, till at length the disappearance of the sun leaves them of a leaden hue, by the reflection of the blue light from the air. A similar change of colour is observed on the snowy tops of the Alps; and the same may be seen, though less strongly, on the eastern and western fronts of white buildings. St. Paul's church, London, is a good object of this kind, and is often, at sun-set, tinged with a considerable degree of redness. What makes the same colours more rich and copious in the clouds is their semi-transparency, joined with the obliquity of their position.

It is highly probable that it is the same coloured light, which being thrown, by the refraction of the atmosphere, into the shadow of the earth, sometimes gives the moon, in a total eclipse, the reddish colour of brick. For the same reason, the colour of the moon will vary in eclipses, according to the extent of atmosphere which the rays have to traverse through.

Sect. V. *Mr. Delaval's Account of the permanent Colours of opaque Bodies.*

Besides the experiments of this gentleman on the colours of transparent bodies, he has lately published an account of some made upon the permanent colours of opaque substances, the discovery of which must be of the utmost consequence in the arts of colour-making and dyeing.

The changes of colour in permanently coloured bodies, our author observes, are produced by the same laws that take place in transparent colourless substances; and the experiments by which they are investigated consist chiefly of various methods of uniting the colouring particles into larger masses, or dividing them into smaller ones. Sir Isaac Newton made his experiments chiefly on transparent substances; and in the few places where he treats of others, he acknowledges his want of experiments. He makes the following remark, however, on those bodies which reflect one kind of light and transmit another, viz. that if these glasses or liquors were so thick and massy that no light could get through them, he questioned whether they would not, like other opaque bodies, appear of one and the same colour in all positions of the eye; though he could not yet affirm it from experience. Indeed it was the opinion of this great philosopher, that all coloured matter reflects the rays of light, some reflecting the more refrangible rays most copiously, and others that are less so; and that this is at once the true and only reason of these colours. He was likewise of opinion that opaque bodies reflect the light from their anterior surface, by some power of the body evenly diffused over and external to it. With respect to transparent coloured bodies he thus expresses himself: "A transparent body which looks of any colour by transmitted light, may also look of the same colour by reflected light; the light of that colour being reflected by the farther surface of that body, or by the air beyond it: and then the reflected colour will be diminished, and perhaps cease, by making the body very thick, and pitching it on the back-side to diminish the reflection of its farther surface, so that the light reflected from the tinging particles may predominate. In such cases the colour of the reflected light will be apt to vary from that of the light transmitted."

To search out the truth of these opinions, Mr. Delaval entered upon a course of experiments with transparent coloured liquors and glasses, as well as with opaque and semitransparent bodies. And from these experiments he discovered several remarkable properties of the colouring matter; particularly, that in transparent coloured substances it does not reflect any light; and when, by intercepting the light which was transmitted, it is hindered from passing through such substances, they do not vary from their former colour to any other, but become entirely black.

This incapacity of the colouring particles of transparent bodies to reflect light being deduced from very numerous experiments, may therefore be taken as a general law. It will appear the more extensive, if it be considered that, for the most part, the tinging particles of liquors, or other transparent substances, are extracted from opaque bodies; that the opaque bodies owe their colours to those particles, in like manner as the transparent substances do; and that by the loss of them they are deprived of their colours.

Dr. Bancroft, however, in his Experimental Researches concerning the Philosophy of permanent Colours, shews that Mr. Delaval has not noticed the change of nature as well as of specific gravity, which the metals undergo by their being exposed to different degrees of heat, together with the glass. He also observes, that if, according to Mr. Delaval's hypothesis, the densest bodies are of a red colour, or approximating to it, platina, the heaviest of all known metals, ought to be red; instead of which it is white, like tin, and the lightest metals. So also, gold, the heaviest metal next to platina, is much farther removed from the red colour than copper, which is far lighter. With respect to Mr. Delaval's experiments on coloured liquors, Dr. Bancroft says, that instead of choosing and employing mechanical means, which alone are suited to produce those effects, and only those effects, he has recourse to mere chemical agents, whose actions in the ways which he supposes must have been almost doubtful, though their powers of producing other, and very different effects from what he supposes, is most certain. See farther Bancroft's Researches, vol. i.

Notwithstanding all that has been done and

written on the subject of colours, opinions are still much afloat, especially with regard to the number of the primitive colorific rays of solar light. The opinion that there are but three primitive colours has been maintained by M. du Fay, and after him by Father Castell; see Montucla's History, vol. i. pa. 630.

Their argument, however, was, if we may so term it, a *pharmaceutical* one, by no means sufficient to satisfy us as to the real composition of solar light. Dr. Matthew Young, the late learned bishop of Clonfert, in a paper in vol. vii. of the Irish Transactions, has ingeniously attempted to prove that the hypothesis of three primitive colours, red, yellow, and blue, completely solves all the phenomena of the solar spectrum; and is therefore to be preferred.

On this important subject, indeed, though much has been accomplished since the splendid discoveries of Newton, much yet remains to be done before a complete theory can be established. The inquisitive reader will peruse with advantage the researches of Bancroft and Young above referred to; Dr. T. Young's Natural Philosophy, vol. ii.; the able disquisitions on the colours of solar light, and the colours of bodies in the 2d vol. of Haüy's Natural Philosophy; Bertholet's remarks on the primitive colours in the arts, blue, yellow, and red, in his Elemens de Teinture; and Prieur's Considerations concerning Colours, in the Retrospect of Philosophical Discoveries, vols. i. and iii.

Before we quit this part of the subject it may not be improper to make one farther observation, on account of the mischievous inferences deduced from the Newtonian theory, by Voltaire and some other writers. These men suppose that light and colour, as apprehended by the imagination, are only ideas in the mind, and not qualities that have any existence of matter. Strange as this may seem, it has been universally received, and considered by some as one of the noblest discoveries of modern philosophy.

By colours all men, who have not formed erroneous notions, understand not a sensation of the mind, which can have no existence when it is not perceived, but a quality and modification of bodies, which continues the same whether it be seen or concealed. The scarlet rose is not less a scarlet rose when we shut our eyes, and was so at midnight when no eye saw it. The colour surely remains when the appearance ceases; and it remains the same even when the appearance changes; for when we view this scarlet rose through a pair of green spectacles, the appearance is changed; but we do not conceive the colour in the rose to be changed. To a person in a jaundice it has still another appearance, but he is easily convinced the change is in his eye, and not in the colour of the object. We can, by a variety of optical experiments, change the appearance of figure and magnitude in a body, as well as that in colour; we can make one body appear to be ten. But no man believes the multiplying glass really produces ten guineas out of one; in like manner, no one believes the coloured glass changes the real colour of the object seen through it, when it alters the appearance of that colour.

Colour, therefore, is not a sensation, but a secondary quality of bodies, whereby in fair daylight they exhibit a certain and well understood appearance; and there is a real permanent quality in bodies, to which the common use of this word agrees. Had modern philosophers given, as they ought to have done, the name of colour to the cause instead of to the effect, they would not have set philosophy apparently in contradiction with common sense; for they must then have affirmed with the vulgar, that colour is a property of bodies, and that there is nothing like it in the mind. Their language, as well as their sentiments, would have been perfectly agreeable to the common apprehensions of mankind, and true philosophy would have joined hands with common sense.

Colour (Accidental), a name given to a very curious optical phenomenon, which was first, we believe, attended to by Buffon. That philosopher wrote a short paper on it, which was published in the Memoirs of the Academy of Sciences for the year 1743.

If a person look stedfastly and for a considerable time at a small red square painted upon white paper, he will at last observe a kind of green-coloured border surround the red square. If he now turn his eyes to some other part of the paper, he will see an imaginary square of a delicate green bordering on blue, and corresponding exactly in point of size with the red square. This imaginary square continues visible for some time, and indeed does not appear till the eye has viewed successively a number of new objects. It is to this imaginary square that the improper name of accidental colour has been given. If the small square be yellow, the imaginary square or accidental colour is blue: the accidental colour of green is red; of blue, yellow; of white, black; and, on the contrary, that of black is white.

The first person, as far as we know, who gave a satisfactory explanation of these phenomena was, professor Scherffer of Vienna, whose dissertation, translated by Mr. Bernoulli, has been published in the 26th volume of the Journal de Physique.

In order to understand these phenomena, let us recollect, in the first place, that light consists of seven rays, namely, red, orange, yellow, green, blue, indigo, violet; that whiteness consists in a mixture of all these rays; and that those bodies which reflect but very little light are black. Those bodies that are of any particular colour, reflect a much greater quantity of the rays which constitute that particular colour than of any other rays. Thus red bodies reflect most red rays; green bodies, most green rays, and so on.

Let us recollect, in the second place, that when two impressions are made at the same time upon any of our organs of sensation, one of which is strong and the other weak, we only perceive the former. Thus if we examine by the prism the rays reflected by a red rose we shall find that they are of four kinds, namely, red, yellow, green, and blue. In this case, the impression made by the red rays makes that made by the others quite insensible. For the same reason, when a person goes from broad daylight into an ill-lighted room, it appears to him at first perfectly dark, the preceding strong impression rendering him for some time incapable of feeling the weaker impression.

With the assistance of these two remarks, it will not be difficult to explain the phenomena of accidental colours. When a person considers attentively for some time a white square lying on any black substance (paper for instance), it is evident that the part of the retina on which the white square is painted receives a stronger impression than any other part; at least the greatest number of rays strike upon it. A weaker impres-

sion, therefore, will act on it with much less force than upon the rest of the retina. Consequently, when the eye is turned from the white square to some other part of the black paper, a square is perceived of the same size with the white square, and much blacker than any other part of the paper; this is evidently in consequence of the weaker impression made by the rays reflected by the black paper upon that part of the eye previously fatigued by the copious reflection from the white square. For the very same reason, if, after looking for a sufficient time at a white square lying on a black ground, we turn our eyes upon a sheet of white paper, we perceive a very well defined black square. In this case, the part of the retina already fatigued is not so sensible to the rays reflected by the white paper as to the other parts of it which have not been fatigued. The reason then that black is the accidental colour of white is sufficiently evident.

On the contrary, when we look a sufficient time at a black square lying upon a white ground, if we turn our eyes to any other part of the white paper, or even upon black paper, we shall perceive a small square answering to the black square, and much brighter than any other part of the paper: evidently because that part of the retina on which the black square was painted being less fatigued is more susceptible of impressions than any other part of the eye. Thus we see why the accidental colour of black is white, and why that of white on the contrary is black. These facts, indeed, have been long known, and they have been generally explained in this manner.

When a person has looked for a sufficient time at a red square placed on a sheet of white paper, and then turns his eyes to another part of the paper, that part of the retina on which the red was painted being fatigued, the red rays reflected from the white paper cease to make any sensible impression on it, and consequently there will be seen upon the white paper a square similar to the red square, and the colour of which is that which would result from the mixture of all the rays of light except the red. In general, therefore, the accidental colour is the colour which results from the mixture of all the rays of light, those rays excepted which are the same with the primitive colour.

Now, in order to discover these accidental colours, let us recollect the manner which Newton employed to determine the colour which results from the mixture of several others, the species and quantity of which are known. He did it by dividing the circumference of a circle, so that the arches are to one another in the proportion of a string shortened by degrees, in order to sound one after another the notes of an octave; which is nearly the proportion that the different rays occupy when light is decomposed by means of the prism. Or suppose the circumference of the circle, as usual, divided into 360 degrees, the different rays, according to Benvenut, should occupy the following arches:

Red,	45°.
Orange,	27.
Yellow,	48.
Green,	60.
Blue,	60.
Indigo,	40.
Violet,	80.

Let us now compare the action of colours on one another with that of different weights; and for that purpose let us suppose each colour concentrated in the centre of gravity of its arch. In order to find the colour resulting from any mixture, we have only to find the common centre of gravity of the arches which represent the different colours: the colour resulting from the mixture will be that of the arch to which the common centre of gravity approaches nearest. And if that common centre of gravity is not in the straight line which joins the centre of the circle, and the centre of gravity of the arch to which it is most contiguous, the resulting colour will approach more or less to the colour of the contiguous arch towards which the line, passing through the centre of the circle, and the common centre of gravity of the arches, falls. And farther, the resulting colour will be more or less deep according to the distance of the common centre of gravity from the centre of the circle.

In the case under consideration at present, namely, to determine the different accidental colours, the application of this method is remarkably easy; because only one of the seven primitive colours is excluded, and consequently the six colours from the mixture of which we wish to know the resulting colour are all contiguous. For it is evident, that the sum of the six arches, representing these six colours, will be divided into two equal parts by the line which passes through the centre of the circle and their common centre of gravity; and that if the same line be produced till it reaches the circumference of the circle on the other side, it will also divide the arch representing the seventh or omitted colour into two equal parts. Let us suppose, for instance, that the violet is omitted, and that we wanted to know the colour resulting from the mixture of the other six colours, we have only to bisect the arch representing the violet, and from the point of section to draw a diameter to the circle, the arch of the circle opposite to the violet through which the diameter passes will indicate the colour of the mixture. The arch representing the violet being 80°, let us take the half of it, which is 40°, and let us add to it 45° for the red, 27° for the orange, and 48° for the yellow, we shall have 160°, which wants 10° of half the circumference of the circle. If now we add the 60° for the green, the sum total will be 220°, considerably more than half the circumference; consequently the common centre of gravity is nearest the green arch; but it falls 10° nearer the yellow than the straight line which joins the centre of the circle and the centre of gravity of the green arch. Hence we see that the resulting colour will be green, but that it will have a shade of yellow.

It is evident, then, that the accidental colour of violet must be green with a shade of yellow; and this is actually the case, as any one may convince himself by making the experiment.

Suppose, now, we wanted to know the accidental colour of green, or, which is the same thing, the colour resulting from the mixture of all the primitive rays except the green. The green arch is 60°, the half of which is 30°; if to this we add 60° for the blue arch, and 40° for the indigo arch, we shall have 130°, or 50° degrees less than a semicircle. If to this we add the violet arch, which is 80°, we shall have 30° more than the semicircle; consequently the common centre of gravity falls nearest the violet, and it is 10° nearer the red arch than is the centre of gravity of the violet arch. Hence we know that the

accidental colour of green will be violet or purple, with a shade of red: and experiment confirms this.

Buffon observed, that the accidental colour of blue was reddish and pale. Let us see whether we shall obtain the same result from our method. Let us suppose that Buffon employed a light blue. In that case, if to 30, the half of the blue arch, we add 60 for the green, 48 for the yellow, and 27 for the orange, we shall have 165°, or 15° less than half the circumference of the circle; consequently the common centre will fall nearest the red arch, but within 15° of the orange. The accidental colour must therefore be red, with a shade of orange; or, which is the same thing, it must be a pale red.

In the same manner we may discover, that the accidental colour of indigo is yellow, inclining a good deal to orange; and that the accidental colour of indigo and blue together is orange, with a strong shade of red. Both of which correspond accurately with the experiment.

It would be easy to indicate, in the same manner, the accidental colour of any primitive colour, if what has been said were not sufficient to explain the cause of accidental colours, and to show that their phenomena correspond exactly, both with the Newtonian theory of optics, and with what we know to be laws of our sensations in other particulars.

From the theory above given, which is that of professor Scherffer, the following consequences may be deduced:

1. The accidental colour of a red square, lying upon a white or a black ground, ought to be blackish, if we cast our eyes upon a red coloured surface. 2. If the surface upon which we look at a red square be itself coloured, if it be yellow, for instance, the white paper upon which we afterwards cast our eyes will appear blue, with a green square in it corresponding to the original red square. And, in general, we ought to perceive the accidental colour of the ground on which the square is placed, as well as the square itself. 3. If while we are looking at the little square we change the situation of the eye, so that its image shall occupy a different place on the retina, when we turn our eyes to the white paper we shall see two squares, or at least one unlike the figure of the original one. 4. If the white paper on which we look be farther distant than the little square was, the imaginary square will appear considerably larger than the true one. 5. If while we are looking at the little square we gradually make the eye approach to it, without altering its situation, the imaginary square will appear with a pale border. These, and many other consequences that might easily be deduced, will be found to take place constantly and accurately, if any one chooses to put them to the test of experiment; and therefore may be considered as a complete confirmation of the theory given above of the cause of accidental colours.

There is another circumstance respecting accidental colours which deserves attention. If we continue looking stedfastly at the little square longer than is necessary, in order to perceive its accidental colour, we shall at last see its border tinged with the accidental colour of the ground on which the square is lying. For instance, if a white square be placed upon blue paper, its border becomes yellow; if upon red paper, it becomes green; and it becomes reddish upon green. In like manner, the border of a yellow square becomes greenish upon a red ground, and that of a red square on a green ground becomes purple.

The cause of this phenomenon seems to depend upon the contraction and extension of the image of the square painted on the retina. We know for certain, that the diameter of the pupil changes during our inspecting the square; at first it becomes less, and afterwards increases. And though we cannot see what passes in the bottom of the eye, we can scarcely doubt that similar movements are going on there, if we attend to the changes that are continually taking place in the border of our little square; sometimes it is large, sometimes small; at one time it disappears altogether, and the next moment makes its appearance again. *(Sup. Ency. Britan.)*

COLOUR (Diatonic, or musical scale of). In the course of sir Isaac Newton's experiments on the properties of light, he discovered the remarkable fact, that the spectrum of the sun's image, formed by refracted light, let into a darkened room, is longitudinally divided by the points separating the different colours; viz. violet, indigo, blue, green, yellow, orange, and red, into spaces which are respectively equal to $\frac{1}{9}$, $\frac{1}{18}$, $\frac{1}{12}$, $\frac{1}{12}$, $\frac{1}{15}$, $\frac{3}{80}$, and $\frac{1}{18}$, parts of the double length of the spectrum; as, suppose the spectrum to be 360 parts in length, then $\frac{80}{720}$, $\frac{40}{720}$, $\frac{60}{720}$, $\frac{60}{720}$, $\frac{48}{720}$, $\frac{27}{720}$, and $\frac{45}{720}$, will represent the length of each colour respectively, and adding these successively in the reverse order, to $\frac{360}{720}$, we have $\frac{405}{720}$, $\frac{432}{720}$, $\frac{480}{720}$, $\frac{540}{720}$, $\frac{600}{720}$, $\frac{640}{720}$, and $\frac{720}{720}$, which, in their lowest terms, are $\frac{1}{2}$, $\frac{9}{16}$, $\frac{3}{5}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{8}{9}$, and 1, and appear to be the diatonic ratios answering to the octave, minor seventh, major sixth, fifth, minor fourth, minor third, major second, and key note.

From the experiments of Henry Brougham, jun. Esq. Philosophical Transactions, 1796, it appears, that not only by refraction, but by inflection, deflection, and reflection, the rays of light may be separated on a chart or screen: and he mentions numerous experiments, wherein the limits of the several colours on the spectrum were carefully marked with the point of a needle, after which the papers thus marked were put away, and a fresh paper substituted for other experiments: the measurement or comparison of the lengths of the intervals occupied by each colour on the different papers being purposely deferred, until the whole course of experiments was completed, in order to prevent any preconceived opinions from operating, in making the experiments: the results are represented as agreeing, in the spaces, $\frac{1}{2}$, $\frac{1}{18}$, $\frac{1}{12}$, $\frac{1}{12}$, $\frac{1}{15}$, $\frac{3}{80}$, and $\frac{1}{16}$, occupied, by the violet, indigo, blue, green, yellow, orange, and red colours, being the very same, as to arrangement, as those by refraction abovementioned.

COLOURS, in dyeing. See DYEING.

COLOUR OF THE HUMAN SPECIES (Difference of.) See COMPLEXION.

COLOUR, in heraldry. The colours generally used in heraldry are, red, blue, black, green, and purple; which the heralds call gules, azure, sable, vert or sinople, and purpure; tenne, or tawny, and sanguine, are not so common: as to yellow and white, called or and argent, they are metals, not colours. The metals and colours are sometimes expressed in blazon by the names of precious stones, and sometimes by those of planets or stars.

COLOURS, in the military art, include the ban-

ners, flags, ensigns, &c. of all kinds, borne in the army or fleet. See FLAG and STANDARD.

COLOURS, in the Latin and Greek churches, are used to distinguish several mysteries and feasts celebrated therein. Five colours only are regularly admitted into the Latin church: these are white, green, red, violet, and black. The white is for the mysteries of our Saviour, the feast of the Virgin, those of the angels, saints, and confessors; the red is for the mysteries and solemnities of the holy sacrament, the feasts of the apostles and martyrs; the green for the time between pentecost and advent, and from epiphany to septuagesima; the violet in advent and Christmas, in vigils, rogations, &c. and in votive masses in time of war; lastly, the black is for the dead, and the ceremonies thereto belonging. In the Greek church, the use of colours is almost abolished, as well as among us. Red was, in the Greek church, the colour for Christmas and the dead, as black is among us.

COLOUR, in painting, is applied both to the drugs made use of in that art, and to the tints produced by those drugs variously mixed and applied.

Colours may be either pigments or fluids. By pigments is meant all such solid bodies as require to be mixed with some fluid, as a vehicle, before they can be used as paints, except in the case of crayons, where they are used dry. These make the far greater part of the whole; the fluid colours being only a small number employed along with water-colours: and asphaltum, which is sometimes employed in oil-painting.

Colours are distinguished into several kinds, according to the vehicles in which they are worked, as oil-colours, water-colours, enamel-colours, &c. The same sorts of pigments, however, are, in many instances, employed in more than one kind of painting, as vermilion and lake in several, and ultramarine in all.

The principal qualities in colours, considered with regard to their perfection or faultiness, are two; purity of colour, and durableness: purity of colour is, by the painters, called brightness, and the defect of it foulness, or sometimes the breaking the colour: durableness is called standing, and the negative, or want of it, flying, or flying off.

Brightness and standing well are the only properties which are necessary to the perfection of every kind of colours, and they equally relate to all; but there are others which are essential to many sorts, with regard only to particular purposes and uses. As transparency, and opacity, that of drying well, and, as it is called, not fattening; and, lastly those distinguished by the names of warmth and coolness: all which are well known to painters.

The colours used in all the several kinds of painting, are described under the names of the various substances, as *Prussian* BLUE, CARMINE, VERMILION, &c. The reader may farther consult Tingry's Painter's and Varnisher's Guide.

COLOUR, in law, is a probable or plausible plea, though in reality false at bottom, and only calculated to draw the trial of the cause from the jury to the judge; and therefore colour ought to be matter of law, or doubtful to the jury.

In pleading it is a rule that no man be allowed to plead specially such a plea as amounts only to the general issue; but in such case he shall be driven to plead the general issue in terms by which the whole question is referred to a jury. But if a defendant in an assize, or action of trespass, be desirous to refer the validity of his title to the court rather than to the jury, he may state his title specially, and at the same time give colour to the plaintiff; or suppose him to have an appearance or colour of title, bad indeed in point of law, but of which the jury are not competent judges.

COLOURS, in ancient music, a term used to signify the species of a genus. Thus the *Chromatic*, had three colours; the *Diatonic*, two; the *Enharmonic*, one.

CO'LOURABLE. *a.* (from *colour.*) Specious; plausible (*Spenser*).

CO'LOURABLY. *ad.* (from *colourable.*) Speciously; plausibly (*Bacon*).

CO'LOURED. *part. a.* Streaked; diversified with hues (*Bacon*).

COLOURED LEAF. In botany; of any other hue than green.

COLOURED CALYX. Calyx of any other colour than green, as in BARTSIA.

COLOURING, among painters, the manner of applying and conducting the colours of a picture; or the mixtures of light and shadows formed by the various colours employed in painting. The colouring is one of the chief branches in painting, which art is, by Mr. Felibien, divided into three parts, the design, the composition, and the colouring. See PAINTING.

Though the colouring is most striking, yet, among masters, it always gives place to the exactness of the design. According to M. de Piles, the word colouring, in a more limited sense, is chiefly applicable to a history-piece, scarce at all to landscapes: he adds, that the term relates more immediately to the carnations than to any thing else. The colouring, in its general sense, comprehends whatever relates to the nature and union of colours; their agreement or antipathy; how to use them to advantage in light and shadow, so as to shew a relievo in the figures, and a sinking of the ground; what relates to the aerial perspective, that is, the diminution of colours by means of the interposition of the air; the various accidents and circumstances of the luminary, and the medium; the different light both of the bodies illuminating and illuminated; the reflections, shadows, and different views with regard to the position of the eye, or the object; what produces strength, boldness, sweetness, &c. in paintings, well coloured; the various manner of colouring, both in figures, landscapes, &c.

The coloris, or colouring, is different from colour; the latter renders the object sensible to the eye; the former is that by which the painter knows how to imitate the colour of all natural objects, by a judicious mixture of the simple colours upon his pallet: it teaches the manner in which colours are to be used for producing those fine effects of the chiaro obscuro, light and shade, which add boldness and a kind of relievo to the figures, and shew the remoter objects in their just light.

For the effects of colours, painters regard either the union or the œconomy: with respect to the first, care must be taken that they be laid so as to be sweetly united under the briskness of some principal one; that they participate of the prevailing light of the piece; and that they partake of each other by the communication of light and the help of reflection.

CO'LOURIST. *s.* (from *colour.*) A painter who excels in giving the proper colours to his designs (*Dryden*).

CO'LOURLESS. *a.* (from *colour.*) Without colour; transparent (*Bentley*).

COLPODA. In zoology, a genus of the class vermes, order infusoria. Worm invisible to the naked eye, very simple, pellucid, flat, sinuate. Seven species: generally found in water impregnated with vegetables; chiefly in meadow-water or infusions of hay.

COLPOS, COLPUS, (κολπος). In anatomy, the vagina. This term is often connected with some other in compound words, as, colpocele, a tumour or hernia seated in the vagina: colpoptosis, a bearing, or falling down of the vagina.

COLSTON (Edward), an eminent English philanthropist. He was born at Bristol in 1636, and carried on his father's business of a Spanish merchant, by which he acquired a large fortune, and disposed the greatest part of it in acts of charity. He built several almshouses and charity schools in his native city, and gave large sums in his life-time and by will to hospitals, and other beneficent institutions. He died in 1721, and was buried in All Saints church, where a sermon is yearly preached in honour of his memory.

COLT, in the general sense of the term, implies a produce from horse and mare, of either gender; though in sporting and horsemanship the term colt is confined to the male foal, while the female is termed a filly. The bone and growth of a colt depends greatly upon two circumstances: the first, his being foaled late or early; that is, early in April, or late in June; as well as the difference of his being weaned in November or March. Although it is admitted that colts (in the first year termed foals) running with the dam during the winter, will afford greater probability of size, bone, and strength, yet it is not at all times this rule can be complied with, unless in studs, where brood mares are kept for that purpose only, and are left fallow (uncovered) for the season. When a mare has been covered with a foal at her foot, and is evidently in foal again, it should be an invariable rule to wean the foal in October or November, from the impossibility of her giving suck to the foal without impoverishing the fetus. Whether the colt be, or be not, weaned in either of those months, he should be well kept, and have daily supplies of corn and hay, as well as proper stable, shed, or shelter room from the inclemency of the winter season. Upon the liberal keep of the first two winters, his size, growth, strength, and bone, entirely depend, which must hence be particularly attended to; for it must be held in remembrance, that if a colt be small at two years old, from having been stinted in keep, it is a hundred to one if he ever attain to good size, by any additional exertions or expence.

As colts of any description (except for the turf) are seldom taken in hand, or at least offered for sale, or brought into work, till they are three years old, it is unnecessary to go into a minute description of their age by the teeth previous to this period. Suffice it, therefore, to observe, that the first twelve teeth in the front of the mouth are, from their earliest appearance, called colt's teeth, and so continue to be, till dispossessed, and followed by others.

Colts' teeth are, in whiteness and appearance, not inferior to polished ivory; are individually smooth upon the surface, or seat of mastication, and so continue till some time between two and a half and three years old; when, a few weeks sooner or later, (depending entirely upon their having been late or early foals,) the colt sheds the two middle teeth of the six in the under jaw: which are pushed forward, and succeeded by two of a stronger texture deeper in colour, and fluted, or exhibiting small grooves from top to bottom, with a black cavity in the centre.

Some time in the last half of the fourth year, the same process takes place with the teeth on each side the two in the centre, so that at four years old we find a repetition of, or addition to, the first two, at which particular period he becomes possessed of four horse teeth in the middle, and one colt's tooth only on each side.

At this period, that is, some time in the autumn, as September, October, or November (depending still upon his having been a late or early foal), he sheds the two remaining outside or corner teeth, the successors to which continue to push out till the May or June following; when he is full in the mouth, five years old, and is then called a horse.

During the course of this year, the single teeth, named tusks, seated beyond the corner teeth upon the bars, make their appearance; and proper attention to the early or advanced state of this projection, will evidently demonstrate the fifth year of age.

In the space of the last six months of the sixth year, the cavities of the two middle teeth of the six (already described to have succeeded the two in the first change at three years old) gradually fill up, and when turned of six years old, retain only a faint remains of the original black mark, the teeth being nearly or quite smooth upon the surface.

In the last half of the seventh year, when the horse is termed six off, or rising seven, the teeth on each side the two central, last described, become gradually possessed of the same appearance; and when seven years are fully attained, the two outside or corner teeth alone bear any mark of the original cavity. At this period the horse is said to be aged;

and from this time to the completion of his eighth year, the faint mark in the corner teeth continues gradually to disappear (varying a little in different subjects) till quite obliterated, when the age by the teeth is no longer a matter of ascertainment For the rest, see the article AGE.

To COLT. *v. n.* To frisk; to frolick (*Spen.*).

To COLT. *v. a.* To befool (*Shakspeare*).

COLTIC, a term used by timber merchants for a defect or blemish in some of the annular circles of a tree, whereby it is rendered unfit for many purposes, and its value diminished.

COLT'S-FOOT. In botany. See TUSSILAGO.

COLT'S FOOT ALPINE. See CACALIA.

COLTS-TOOTH. *s.* 1. An imperfect tooth in young horses. 2. A love of youthful pleasure (*Shakspeare*).

CO'LTER. *s.* (culꞇoꞃ, Saxon.) The iron of a plough that cuts perpendicularly to the share.

CO'LTISH. *a.* (from *colt.*) Wanton.

CO'LUBER. Viper. In zoology, a genus of the class amphibia, order serpentes. Plates on the belly; scales under the tail. A hundred and seventy-five species. In the investigation of this genus, the tail-scales, or subcaudal squammæ, although placed alternately, are reckoned by pairs, so that the number marked in relation to the respective species, is always to be understood to mean so many pairs. The following are the chief species.

1. C. berus. Common viper. Plates of the belly a hundred and forty-six: scales of the tail thirty-nine. Body cinereous, or (which is probably the male) tawny-brown, or blackish; a dark indented stripe along the middle of the back, or dark-brown; belly tinged with purple, spotted with black; throat pale; irids orange; pupil black. Four other varieties, from difference in colour, spots or stripes, in India, and St. Eustace. Inhabits Europe and Siberia; lives in woods and thickets, and in breeding time, in the open fields; is poisonous, but not deadly; grows to one and a half foot long; the flesh formerly used medicinally as a restorative. The poisonous matter discharged is a real gum, and perhaps the only gum actually produced and secreted by animals of any kind. Oil, volatile alkalies, and a variety of other applications have been resorted to as antidotes, but olive oil appears to be the most successful. Sucking the wound is probably a means of withdrawing a part of the venom, and appears to have been advantageously employed formerly. It is doubtful whether the poison be capable of producing any injury to the system when thus received into the mouth, or even the stomach. The Psylli practise the method of sucking poisoned wounds, and even swallow the animal's head, poison and all, without fear. A few cases seem to arise in opposition to the general result; but it is probable that in such there may have been some ulcer in the mouth or throat. The viper is viviparous, producing its young towards the close of summer: the number of the young fry is usually from ten to fifteen or eighteen. It is asserted by many naturalists that the female viper in cases of sudden surprise or danger opens her mouth, and admits her young down her throat, just as the opossum does her brood into the pouch under her belly upon similar emergencies. This curious property was believed by sir Thomas Brown, and Mr. White; and Dr. Shaw lends his faith to it.

2. C. cerastes. Horned viper. Plates of the belly a hundred and fifty; scales of the tail twenty-five; above the eyes a pair of horns or curved processes pointing forwards: length from a foot to a foot and half: colour rusty brown, with darker spots; belly blueish. This serpent springs suddenly to a considerable distance, and bites without provocation those who approach it. Inhabits the east; abounds in the three Arabias and in Africa. It is probably the aspic employed by Cleopatra. According to the testimony of reputable travellers, the natives of the countries infested by these animals either possess a natural aroma, or are capable of obtaining by the use of herbs or other preparations an aroma of a similar kind, operating as a charm or stupefaction upon these and other noxious serpents, by which the person is secure against being bitten, however irritated the animal may be. Mr. Bruce tells us, from actual observation, that all the black people in the kingdom of Sennaar, whether Funge or Nuba, are armed naturally against the bite: but that the Arabs have no such defence naturally, and are obliged to prepare themselves by decoctions of certain herbs and roots, which, however, he does not accurately describe; and which he was always afraid to trust to by way of personal experiment. See Nat. Hist. Pl. XLVIII.

3. C. chersea. Plates of the belly a hundred and fifty; scales of the tail thirty-four. Nine and half inches long; body less than the berus, and of a much deeper bay; along the back a dark, indented line; head oval, trunk round. Inhabits low, shrubby places in Sweden; resembles the berus, but its bite more certainly and speedily fatal, if the place bitten be not instantly extirpated.

4. C. lebetinus. Plates of the belly a hundred and fifty-five; scales of the tail forty-six. About one and half foot long, tail four inches long; beneath whitish, varied with thick black or brown dots; above grey, with four rows of transverse alternate spots, the middle ones yellowish, the side ones brown or blackish. Inhabits the east; and destroys the person bitten by producing an unconquerable and deadly sleep.

5. C. natrix. Ringed snake. Plates of the belly a hundred and seventy; scales of the tail sixty. Body above blackish, with a white spot on each side the neck; back subcarinate; scales of the back oblong-oval, carinate in the middle, disposed in nineteen rows; beneath white, sometimes yellowish or brownish, with a longitudinal, irregular, broadish

NATURAL HISTORY.

PL. XLVIII.

Cerastes

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black stripe down the middle, beginning at the fifteenth plate: snout acute. Inhabits Europe; lives usually in hedges, shrubberies or old buildings; is fond of heat and sun-shine; deposits its eggs in dung-heaps, or under rotten trees, which are connected in a mass by a secreted mucus. Three feet nine inches long. Five other varieties; differing chiefly in colour, and spot or stripe. This animal is innoxious; and Mr. White informs us that he knew a gentleman who had tamed it so completely as to make it his frequent companion. It had this curious property, that although it was perfectly sweet in its odour in common, yet upon the appearance of a stranger, it would begin to hiss, and immediately exude an effluvium so nauseous as to be scarcely tolerable. All these species cast their scales in the spring, commencing by a slit or division at the lips: and so complete is the exfoliation, that the cuticle of the eye itself is thrown off at the same time. The entire spoil is perfectly transparent.

6. C. naja: or cobra de capello. Spectacle, or hooded snake. Plates of the belly a hundred and ninety-three; scales of the tail sixty. Rusty yellow; with the neck generally much dilated, and marked above with a spectacle-shaped spot of black and white. There are three other varieties, differing only slightly in colour or spotting. Inhabits India and the Ternate Islands. The most venomous of its tribe, and hardly inferior to the rattle-snake in the malignity of its poison. General length from three to four feet, diameter of the head, which is small and covered with large scales, an inch and quarter. This formidable serpent has obtained its Portuguese name of cobra de capello, or hooded snake, from the appearance it presents when viewed in front in an irritated state, or when preparing to bite: at which time it bends the head rather downward, and seems hooded as it were in some degree, by the expanded skin of the neck. In India it is every where exhibited publicly as a show; and is of course more universally known in that country than any other of the race of reptiles. It is carried about in a covered basket, and so managed by its proprietors as to assume, when exhibited, a kind of dancing motion; raising itself up on its lower part, and alternately moving its head and body from side to side for some minutes, to the sound of some musical instrument which is played during the time. The Indian jugglers, who thus exhibit the animal, first deprive it of its fangs, by which means they are secure from the danger of its bite. It does not appear that a bite given to another serpent of the same species is able to poison it, though many experiments have been made to ascertain this fact: yet other serpents not of the same species are as fatally injured by the bite as a pigeon or a rabbit.

7. C. dione. Plates of the belly a hundred and ninety: scales of the tail sixty-six: head small, square, reticulate, with brown sutures: teeth in four pectinate rows; back delicate blue or whitish with three longitudinal whiter streaks, and intermediate, alternate, brown dashes, often subconfluent; belly whitish, with minute livid-brown spots or reddish specks. Inhabits the salt deserts near the Caspian sea, and the dry salt-mountains near the Irtish: is slender and very elegant. About three feet long.

8. C. constrictor. Plates of the belly a hundred and eighty-six: scales of the tail twenty-nine: very smooth and slender; black, beneath pale blue; throat white. Inhabits North America: runs swiftly and bites very hard, but is not poisonous; twists itself round the legs of such as approach it.

9. C. caspius. Plates of the belly a hundred and ninety-eight; scales of the tail a hundred. Inhabits shrubby and low places on the shores of the Caspian sea: is fearful of man unless when irritated, when it violently attacks him, running along the ground with its head erect, and making a loud hissing. About five feet long: above alternately banded with yellow and brown; beneath yellow.

10. C. aspis. Asp. Plates of the belly a hundred and forty-six; scales of the tail forty-six. Nose terminated by an erect wart; body tawny with figured streaks alternately distinct and confluent, beneath steel-blue, dotted with yellow. Inhabits Dauphiny, Lyons, and Poitiers: is perhaps a variety of the berus.

11. C. aquaticus. Water-viper, water rattle-snake. Brown; the belly banded with black and yellow: tail small towards the end, terminating in a blunt, horny point, about half an inch in length. The point harmless, but believed by the vulgar to be possessed of a power of mortally poisoning both animals and vegetables. The fang bite said to be as fatal as the sting of the rattle-snake. Frequents the water, and is never seen at any great distance from it; is very nimble and dexterous in catching fishes. In the summer generally seen lying gregariously on the branches of trees hanging over rivers, watching to surprise either fishes or birds, upon which they plunge with great swiftness. A native of Carolina, and other parts of North America.

COLUBRI'NA VIRGINEA'NÆ. See Serpentaria.

CO'LUBRINE. *a.* (*colubrinus*, Latin.) 1. Relating to a serpent. 2. Cunning; crafty.

COLUBRI'NUM LIGNUM. (*colubrinus*, from *coluber*; so called from the snake-like contortions of its roots). This species of snake-wood is brought from America. It is solid, ponderous, acrid, extremely bitter, and inodorous; its bark is of a ferruginous colour, covered with cineritious spots.

COLUMB (St.) a town in Cornwall, with a market on Thursdays. Lat. 50. 30 N. Lon. 4. 52 W.

COLU'MBA. Pigeon. Bill straight, descending towards the tip; nostrils oblong, half-covered with a soft tumid membrane. Eighty-two species, scattered over the globe: which may be thus subdivided into sections.

A. Tail even and moderate.

B. Tail long, and wedged. The former contains the most numerous species. The following, occasionally selected from both sections, are the most worthy of remark.

1. C. domestica: a numerous family of itself, and which possesses the following varieties.

α. Common pigeon. Cinereous; rump white; band on the wings and tip of the tail blackish.
β. Stock-dove. Wings with a double blackish band.
γ. Rock-pigeon. Quill feathers brown. See Plate LIV.
δ. Roman-pigeon. Cere white, scurfy.
ε. Rough-footed pigeon. Legs rough with feathers.
ζ. Crested pigeon. Legs rough: head crested.
η. Norway-pigeon. Crested; body snowy; legs rough.
θ. Barbary-pigeon. Area of the eyes naked, tuberculate: wings with each a double black spot.
ι. Jacobine-pigeon. Feathers of the hind-head erect, reflected.
κ. Laced-pigeon. Down small, erect, dispersed over the back and wings.
λ. Turbit-pigeon. Feathers on the breast recurvate.
μ. Shaker-pigeon. Tail erect, many-feathered, broad.
ν. Tumbler-pigeon. Tumbles over and over in flight.
ξ. Helmet-pigeon. Head, quill, and tail feathers of one colour, but different from that of the body.
ο. Turkish pigeon. Cere granulated, red.
π. Carrier-pigeon. Cere broad, carunculate, whitish; eyelids naked.
ρ. Powter-pigeon. Crop inflated.
σ. Horseman-pigeon. Crop inflated, cere carunculate.
τ. Smiter-pigeon. Strikes its wings violently in flight.
υ. Turner-pigeon. Crest hanging down from the crown like a mane.
. Spot-pigeon. White: tail and spot on the front of one colour.

Inhabits and is domesticated in almost every part of Europe and Asia: fourteen or fifteen inches long; lays from nine to eleven times a year.

2. C. œnas. Stock-pigeon. Blueish; neck above glossy green; double band on the wings and tip of the tail blackish: throat and breast claret colour; claws black. Often confounded with the domestic pigeon, but hereby sufficiently discriminated. Inhabits old turrets and rocky banks of Europe and Siberia, and migrates southerly in winter. About fourteen inches long.

3. C. palumbes. Ring-dove. Cinereous: tail-feathers black on the hind-part; primary quill-feathers whitish on the outer edge; neck each side white. Inhabits Europe: very occasionally Siberia: lives in woods, and builds in trees. Seven and a half inches long.

4. C. turtur. Turtle-dove. Tail-feathers tipt with white; back grey; breast flesh-colour; on each side of the neck a spot of black feathers tipt with white. Two other varieties, from difference of colour, or spot. Inhabits Europe, China, and India: twelve inches long; migrates in flocks and breeds in thick woods: is very shy and retired, and a pest to fields of peas.

5. C. passerina. Ground-pigeon. Wings and tail dusky; body purplish; bill and legs red. Three other varieties from spots or the possession of chesnut-eyes, the irids in common being orange. Inhabits the warm parts of America: six and a quarter inches long; frequents rocky and mountainous places, and feeds on seeds.

6. C. migratoria. Passenger-pigeon. Orbits naked, sanguine; breast rufous: bill black; irids orange; body cinereous, beneath vinaceous; wing-coverts spotted with black; sides of the neck purple; quill-feathers black-brown edged with whitish; two middle tail-feathers blackish-brown, the rest hoary. Inhabits North America, and flies in prodigious flocks, sometimes continuing for three days together in one direction: very troublesome to rice and corn-fields: from fifteen to sixteen inches long. Another variety from variety in its spots and hues.

7. C. coronata. Great crowned Indian-pigeon. Blueish, above cinereous; orbits black; crest erect; shoulders ferruginous. Bill and lares black; irids red; crest compressed, five inches long: legs various in colour. Inhabits New Guinea, and is as large as a turkey: yet has the cooing note as well as other characteristics of the pigeon. Has occasionally been brought alive to England.

Columba noachi, in astronomy, Noah's dove, a southern constellation consisting of 10 stars: i. e. 0. 2. 0. 1. 6. 1.

COLUMBATE OF IRON. See Columbium.

COLUMBIA, a city of South Carolina, on the river Congaree. It is the seat of the government of South Carolina, and 100 miles N.W. of Charleston. Lat. 33. 58 N. Lon. 81. 10 W.

Columbia, a territory of North America, the seat of the new capital of the United States. See Washington.

COLUMBINE, in botany. See Aquilegia.

Columbine, is also the name of the principal actress, or heroine, in pantomimes.

COLU'MBIUM. Columbite. In oryctology, a genus of the class metals. Brownish-black; internally iron-grey, with a chocolate brown streak and powder, hardish, very brittle, of an imperfectly foliated texture, opaque, not attracted by the magnet: specific gravity 5,918. One species only, sent to sir Hans Sloane from Massachusets, and at present in the British Museum. Contains

Oxyd of columbium . . .	78.
Oxyd of iron	21.
	99.

COLUMBO. See COLOMBA.

COLUMBTON, a town in Devonshire, with a market on Saturdays. It has a woollen manufacture, and is seated on the river Columb. Lat. 50. 53 N. Lon. 3. 23 W.

COLUMBUS (Christopher), a celebrated navigator. He was born at Genoa in 1442, and it is generally admitted that he was bred to his father's trade, which was that of a woolcomber; but that he quitted it from disgust, and went to sea. He studied mathematics, particularly such branches as are connected with cosmography and nautical astronomy, with great success: and in part perhaps from his own contemplations, but more fully from communications with Behem, he formed the idea of another continent beyond the western ocean. This he made known to the king of Portugal; but not meeting with encouragement, he applied to Ferdinand and Isabella of Spain, who consented to furnish him with three ships. He sailed from Gomera, September 6, 1492, and October 12th, he landed at Guana bay, one of the Lucca islands; from thence he sailed to Cuba and Hispaniola; and having taken possession of them in the name of his sovereign, he returned to Europe, where he was received with every demonstration of joy and respect. He was honoured with the patent of nobility, and made admiral of the Indies, in which quality he set sail again, and made the discovery of Jamaica; but finding that evil reports had been circulated against him, he returned to Spain, where he fully vindicated himself from every accusation of his slanderers. In 1498 he made a third voyage, and discovered Paria; which was the first place he had seen on the continent. In 1500 he was basely sent home in irons upon a most malicious charge; but he soon cleared himself to the king, and went upon another expedition. He died in 1506, and his remains were interred in the cathedral at Seville, beneath a tomb, on which is this inscription, "Columbus gave Castille and Leon a new world."

On the subject of the discovery of America, consult the articles BEHEM and CABOT.

COLUME'LLA, (*columella*, a dim. of *columna*, a column.) In anatomy. See UVULA and CLITORIS.

COLUME'LLA. In botany, the central pillar in a capsule. The part connecting the inside with the seeds; taking its rise from the receptacle, and having the seeds fixed to it all round.

COLUMELLA. In botany, a genus of the class syngenesia, order polygamia superflua. Receptacle naked, cellular; seeds crowned with a toothed margin; calyx cylindrical imbricate; florets of the ray undivided. One species only—a native of the Cape, with pubescent, coryrmbed stem; leaves linear, sessile, obtuse, hairy; flowers lateral, sessile, solitary; disk and ray yellow.

COLUMN, in architecture, a round pillar made to support and adorn a building, and composed of a base, a shaft, and capital. Every fulcrum, or support, is so much the more perfect, as it is the firmer, or carries the greater appearance of firmness: and hence all columns, or pillars, ought to have their base, or foot, broader than themselves. Again, as a cylinder and a quadrangular prism are more easily removed out of their place than a truncated cone, or a pyramid, on the same base, and of the same altitude; the figure of columns ought not to be cylindrical; nor, that of a pilaster, pyramidal; but both the one and the other to be contracted, or diminished; i. e. to become less and less, like a truncated cone, and a truncated pyramid. For the same reason, the lowest parts of columns ought to be cylindrical; that of pilasters, pyramidal; hence, again, as columns are more firm, if their diameter bears a greater proportion to their height, than if it bore a less; the greater ratio is to be chosen, where a large weight is to be sustained; and less, where a lesser. Further, as the design of a column is to support a weight, it must never be supposed without an entablature: though a column raised on an eminent place, so as to leave no room to fear its being thrust out of its place, needs no pedestal.

COLUMN (Tuscan), the shortest, and most simple, of all the columns. Its height, according to Vitruvius, Palladio, and Vignola, is seven diameters, or fourteen modules; according to Scamozzi, it is fifteen modules; to De Lorme, twelve; to Trajan's column, sixteen. Its diminution, according to Vitruvius, is one-fourth of the diameter; according to Vignola, a fifth; and according to Trajan's column, a ninth.

COLUMN (Doric), is somewhat more delicate: its shaft is adorned with flutings: its height, according to Vitruvius, is from fourteen to fifteen modules; to Scamozzi, seventeen; in the Coliseum, nineteen. Its diminution, according to the theatre of Marcellus, twelve minutes; to the Coliseum, four minutes and a half.

COLUMN (Ionic), is more delicate still; it is distinguished from the rest by the volute in its capital, and by its base.

Its height, according to Palladio, is seventeen modules one-third; according to Vignola, eighteen. Its diminution, in the temple of Concord, ten minutes and a half; of Fortuna Virilis, seven and a half; Coliseum, ten minutes.

COLUMN (Corinthian), is the richest and most delicate of all the columns. Its capital is adorned with two rows of leaves, and with caulicoles; whence spring out little volutes.

Its height, according to Vitruvius, and many remains of antique porticos, temples, &c. is nineteen modules; to the three columns in the Campo Vaccino, twenty; the basilica of Antoninus, twenty. Its diminution, according to the temple of Peace, is six minutes and a half; the Pantheon, six one-eighth; Constantine's arch, seven; portico of Septimius, seven and a half.

COLUMN (Composite), has two rows of

leaves in its capital, like the Corinthian; and angular volutes, like the Ionic. Its height, according to Vignola, is twenty modules; to Scamozzi, nineteen and a half; its diminution seven or eight minutes.

Thus it appears, that different authors assign different proportions to the same order; we recommend as a proper mean those stated in Plates 3 and 4.

COLUMNS are either engaged or insulated; and when insulated or detached from the wall, they are either very near, or at a considerable distance from it. When they are placed at a considerable distance from the wall, they are destined to support the entablature; and their distance from each other should be consistent both with their real and apparent solidity. Engaged columns are attached to the wall, and are not limited in their intercolumniations, as they depend on the breadth of the arches, doors, windows, niches, or other decorations placed in them.

COLUMN (Colossal), a column of enormous size, too large to enter any ordonnance of architecture; to be placed solitary, in the middle of a square, &c.

COLUMN (Fluted), called also channelled, and striated column; that whose shaft is adorned with flutes, or channellings; either from top to bottom, or only two thirds of its height.

COLUMN (Fluted and cabled), is that whose flutes are filled up with cables, reeds, or staves; beginning from the bottom of the shaft, and reaching one-third of its height.

COLUMN (Gothic), a round pillar, either too short for its bulk, or too slender for its height; as having, sometimes, twenty diameters; and this without either diminution, or swelling; yet its ornaments, and the characters of its work, being as far from those of the antique as its proportions. See Plates 15 and 16.

COLUMN (Pastoral), that whose shaft is formed in imitation of the trunk of a tree, with bark and knots.

COLUMNS are variously denominated from their use: thus, an *Astronomical Column* is a kind of observatory, in form of a very high tower built hollow, and with a spiral ascent to an armillary sphere placed a-top for observing the motions of the heavenly bodies. A *Chronological Column*, is that which bears some historical inscription digested according to the order of the time; as by lustres, olympiads, epochas, &c. A *Funeral Column* is that which bears an urn wherein are supposed to be inclosed the ashes of some deceased hero; and whose shaft is sometimes overspread with tears and flames, which are symbols of grief and immortality. A *Gnomonic Column*, is a cylinder whereon the hour of the day is represented by the shadow of a stile. An *Historic Column*, is that whose shaft is adorned with a basso-relievo, running in a spiral line its whole length, and containing the history of some great personage; such are the Trajan and Antonine columns at Rome. A *Hollow Column*, is that which has a spiral stair-case withinside for the convenience of ascending to the top; as the Trajan column, the stair-case whereof consists of 185 steps, and is illuminated by 43 little windows, each of which is divided by tambours of white marble. The monument or fire-column, at London, has also a stair-case; but does not quite reach the top. *Indicative Column*, is that which serves to shew the tides, &c. along the sea-coasts. Of this kind there is one of marble at Grand Cairo, whereon the overflowings of the Nile are expressed: by this they form a judgment of the succeeding season; when the water, for instance, ascends to 23 feet, it is a sign of great fertility in Egypt. *Instructive Column*, is that raised, according to Josephus, lib. i. cap. 3. by the sons of Adam, whereon were engraven the principles of arts and sciences. Baudelot tells us, that the son of Pisistratus raised another of this kind, of stone, containing the rules and precepts of agriculture. *Itinerary Column*, is a column with several faces, placed in the cross ways in large roads; serving to show the different routes by inscriptions on it. The *Lactary Column*, at Rome, according to Festus, was a column erected in the herb-market, now the place Montanara, which had a cavity in its pedestal, wherein young children abandoned by their parents, out of poverty or inhumanity, were exposed, to be brought up at the public expence. *Legal Column*; among the Lacedemonians there were columns raised in public places, whereon were engraven the fundamental laws of the state. *Limitrophous*, or *Boundary Column*; that which shews the limits of a kingdom or country conquered. Such was that which Pliny says Alexander the Great erected at the extremity of the Indies. *Manubiary Column*, from the Latin *manubiæ*, "spoils of the enemy;" a column adorned with trophies built in imitation of trees, whereon the spoils of enemies were anciently hung. *Memorial Column*; that raised on occasion of any remarkable event; as the monument of London, built to perpetuate the memory of the burning of that city in 1666. *Menian Column*, any column which supports a balcony or meniana. The origin of this kind of column, Suetonius and Ascanius refer to one Menias; who having sold his house to Cato and Flaccus, consuls, to be converted into a public edifice, reserved to himself the right of raising a column withoutside, to bear a balcony, whence he might see the shews. *Miliary Column*, was a column of marble raised by order of Augustus in the middle of the Roman forum; from whence, as a centre, the distances of the several cities, &c. of the empire were reckoned, by other miliary columns disposed at equal distances on all the grand roads. This column was of white marble, the same with that which is now seen on the ballustrade of the perron of the capital of Rome. *Military Column*, among the Romans, a column whereon was engraven a list of the forces in the Roman army, ranged by legions, in their proper order; with design to preserve

the memory of the number of soldiers, and of the order preserved in any military expedition. *Sepulchral Column*, anciently was a column erected on a tomb or sepulchre, with an inscription on its base. Those over the tombs of persons of distinction were very large; those for the common people small: the last are called *stelæ* and *cippi*. *Statuary Column*, that which supports a statue. Such was that erected by pope Paul V. on a pedestal before the church of St. Maria at Rome; to support a statue of the Virgin, which is of gilt brass. This column was dug up in the temple of peace; its shaft is a single block of white marble 49½ feet high, and five feet eight inches diameter, of the Corinthian order. *Triumphal Column*, a column erected among the ancients in honour of an hero; the joints of the stones, or courses whereof, where covered with as many crowns as he had made different military expeditions. Each crown had its particular name, as *vallaris*, which was beset with spikes, in memory of having forced a palisade. *Muralis*, adorned with little turrets or battlements, for having mounted an assault. *Navalis*, of prows and beaks of vessels; for having overcome at sea. *Obsidionales* or *graminalis*, of grass; for having raised a siege. *Ovans*, of myrtle; which expressed an ovation, or little triumph; and *triumphalis*, of laurel, for a grand triumph.

COLUMNS (Diminution of). See ARCHITECTURE, sect. ii. and Plate 14.

COLUMN, means farther: 2. Any body of certain dimensions presiding vertically upon its base (*Bentley*). 3. A long file or row of troops. 4. Half a page, when divided into two equal parts, by a line passing down the middle.

COLU'MNÆ CA'RNEÆ. In anaomy. See CARNEÆ COLUMNÆ.

COLU'MNAR (*Teres*). In botany, like the shaft of a column.

COLUMNIA. In botany, a genus of the class didynamia, order angiospermia. Calyx five-parted; corol ringent, gibbous above the base; the upper lip three-parted, with the middle-divisions vaulted: capsule one-celled; seeds imbedded in the receptacle. Four species, natives of the West Indies. Of these c. scandens is the only one worth noticing. It has a climbing, angular, striate, bristle stem; ovate serrate leaves; solitary, axillary, red flowers.

COLUMNI'FERÆ (*Plantæ*), or COLUMNIFERI (*Flores*). The name of the thirty-fourth order, in the fragments of a natural method in Linnéus's Philosophia Botanica: the thirty-seventh of his natural orders, at the end of genera plantarum: and the fourteenth order of Royen's system. It includes the malvaceous, or mallow-like plants; which are to be found in the class monadelphia of Linnéus's artificial system.

COLURES, in astronomy and geography, two great circles supposed to intersect each other at right angles in the poles of the world, and to pass through the solstitial and equinoctial points of the ecliptic. They are called the solstitial and the equinoctial colures. The word is derived from κολ@-, *mutilus*, or *truncatus*, and ουρα, *tail*; appearing with the tail cut; because never seen entire above the horizon.

COLURI, anciently SALAMIS, an island of Greece. The celebrated Ajax, recorded in the writings of Homer, was king of this island. Its riches consist in wheat, barley, tar, rosin, pit coal, and sponges, which they vend at Athens, this island being only seven miles S. of that city. Lat. 38. 0 N. Lon. 24 5 E.

COLUTEA. Bladder-senna. A genus of the class diadelphia, order decandria. Calyx five-cleft; legume inflated, opening on the upper suture at the base. Thirteen species, chiefly Cape plants, but a few indigenous to Germany, and the Levant. Of these six are deciduous shrubs, the rest herbaceous. They are for the most part furnished with many-lobed leaflets, and beautiful papilionaceous flowers either yellow or red: and may be propagated by seeds or layers.

COLUTHUS, in biography, a Greek poet, a native of Lycopolis, lived under the emperor Anastasius in the beginning of the 6th century. His only work that has come down to us is upon the Rape of Helen, which has been frequently edited, and was translated into French by M. du Molard, in 1742.

COLY, in ornithology. See COLIUS.

COLYDIUM. In the Fabrician entomology, a tribe of the genus DERMESTES: which see.

COLYMBUS. In zoology, a genus of the class aves; order anseres. Bill toothless, subulate, straight, pointed: throat toothed; nostrils linear, at the base of the bill; legs fettered. The birds of this family walk on land with great difficulty, but swim and dive with great dexterity. The guillemots chiefly inhabit the sea, have a slender tongue, the size of the bill; the bill compressed and covered with short feathers at the base, the upper mandible a little bent; flesh tough, and, as well as the eggs, nauseous. The divers frequent the northern lakes, have a strong bill, less pointed, cylindrical; the edge of the mandible turned in, the upper longer; nostrils divided in the middle by a membrane; tongue long, sharp, serrate at the base on each side; legs slender; a black band between the thighs: tail-feathers twenty. The diver is monogamous; flies with difficulty, and in breeding time prefers fresh waters. The grebes are tailless; have a strong bill; lores naked; tongue a little cleft at the tip; body depressed; thickly covered with soft shining plumage; wings short; legs compressed; frequently found about the fresh waters of Southern Europe. The genus is thus subdivided into three sections: the essential characteristics of which however are as follow:

A. Feet three-toed, guillemot.
B. Feet four-toed, palmate diver.
C. Feet four-toed, lobed, grebe. We shall instance a few specimens.

1. C. grylle. Black guillemot. Body black; wing-coverts white. Five other varieties, from additional white in spots or waves. Inhabits Europe and America; from thirteen to fourteen inches long; feeds on fishes, and builds its nest on the ground. Eggs whitish, spotted with black.

2. C. troile. Foolish guillemot. Body black; breast and belly snowy; secondary quill-feathers tipt with white. Two other varieties, one with tail-feathers all black, the other with black cheeks and black band on the wings. Inhabits Europe and America. The first variety seventeen inches long; the third ten inches. In our own country these have been found on the Northumberland coast, the cliffs about Scarborough in Yorkshire, and near the isle of Anglesey.

3. C. septentrionalis. Red-throated diver. Neck beneath with a ferruginous shield-like spot. Inhabits the lakes of Europe, Asia and America; and is often seen at sea: feeds on marine insects, crabs and fishes, which, if pressed by hunger, it will seize from the fishermen's nets: builds a nest of grass and moss near water; and lays two eggs, cinereous, spotted with black; flies about and makes a clamorous noise before storms: two feet five inches long.

4. C. glacialis. Northern diver. Head and neck violet-black; chin and upper part of the neck with a white interrupted band. Inhabits the northern seas, and especially the coasts of Iceland and Greenland, in which places it breeds, and at that time frequents the fresh waters. It has not been often seen on our own shores, nor even seen southerly, except in very severe winters. See Plate XLIII.

5. C. imber. Imber-goose. Body above blackish, waved with white, beneath white. In the male the front and sides of the head and neck are spotted with brown. Inhabits the Arctic ocean: about two feet long. Female makes its nest among reeds and flags, and places it in the water so as to be continually wet. See Plate XLIII.

6. C. cristatus. Crested grebe. Head rufous; collar black; secondary quill-feathers white in the adult bird, at two years old the throat has a long downy tuft on each side; and at a twelve month old the head is smooth; and the wings have a white spot. Inhabits northern Europe; and frequent the great Lincolnshire fen, as well as the meres of Shropshire and Cheshire. Twenty-three inches long; makes a floating nest of grass and aquatic plants, and lays four whitish eggs. See Nat. Hist. Plate XLIII.

COM, or KOM, a town of Persia, in the province of Irak Agemi, celebrated for its silk manufactures, chiefly velvets: 90 miles S. Casbin, and 150 N. Ispahan.

COMA, in medicine. (*coma*, κομα; from κω or κεω, to lie down.) A propensity to sleep.

COMA. (κομη, a head of hair.) In botany, a species of bracte, terminating the stem in a tuft or bush. As in crown imperial; salvia horminum, sylvestris, sclarea, &c.—A spike of flowers terminated by a coma is named comose: and plants with such flowers are ranged in the thirty-sixth of the natural orders, in Linnéus's Philosophia Botanica.

COMA BERENICES, Berenice's hair, in astronomy, a modern constellation of the northern hemisphere, composed of unformed stars between the Lion's tail and Bootes. This constellation contains 31 stars of the first six magnitudes, viz. 0. 0. 0. 10. 10. 11.

CO'MART. *s.* (*con* and *mart.*) Treaty (*Shakspeare*).

COMA'RUM. Marsh cinquefoil. A genus of the class icosandria, polygynia. Calyx ten-cleft, inferior: petals five, less than the calyx: seeds smooth, in an ovate, spongy, villous, permanent receptacle. One species only; indigenous to the marshes of our own country; with stem decumbent at the base, and dark purple flowers. The plant rises about two feet high; and the flowers are followed by a fruit resembling the strawberry.

CO'MATA. (*comata*, κωματα; from *coma*.) Diseases accompanied with a diminution of the powers of voluntary motion, with sleep, or the senses impaired. It is an order of the class neuroses of Cullen's nosology.

CO'MATE. *s.* (*con* and *mate.*) Companion (*Shakspeare*).

COMATOSE. Having a strong propensity to sleep.

COMB. *s.* (camb, Saxon.) 1. An instrument to separate and adjust the hair (*Newton*). 2. The top or crest of a cock (*Dryden*). 3. The cavities in which the bees lodge their honey (*Dryden*).

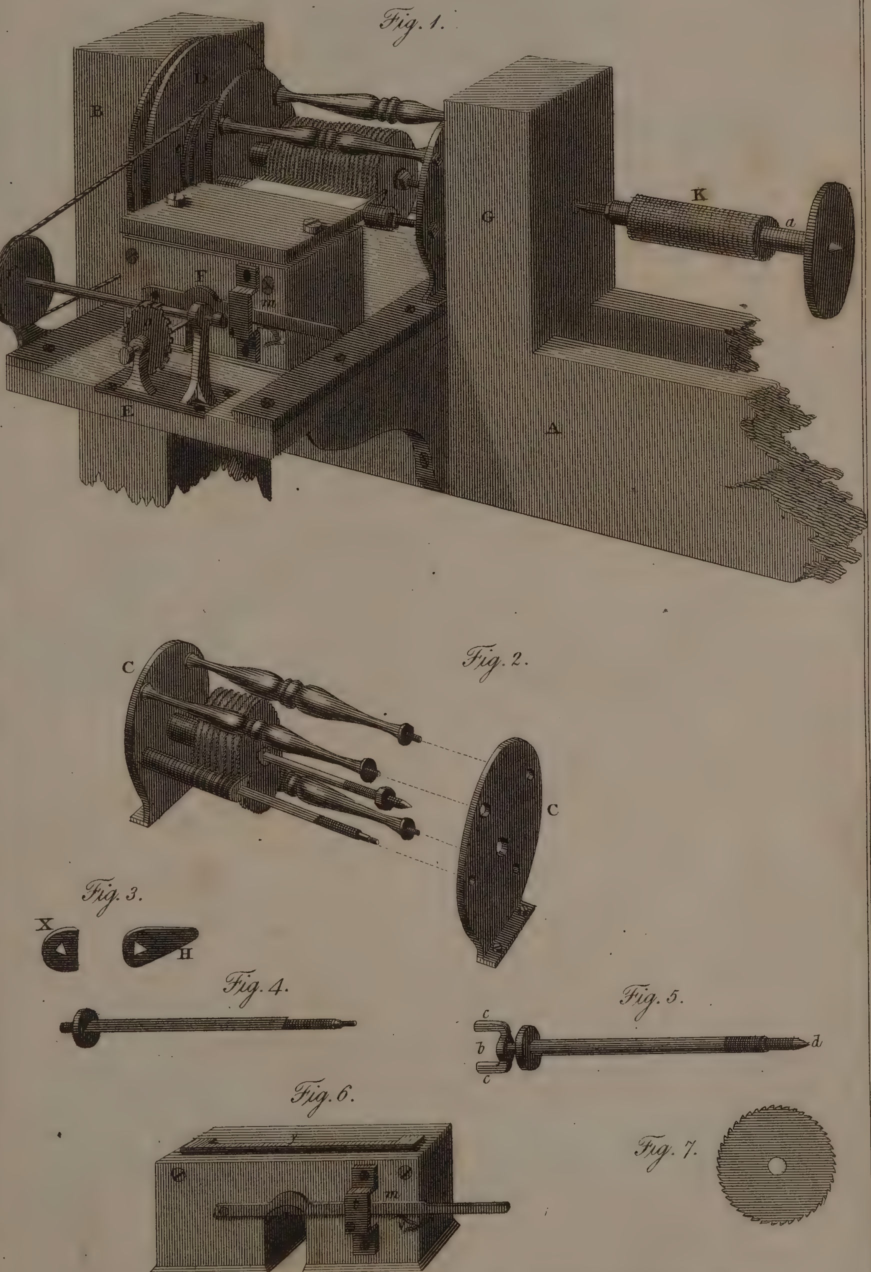
To COMB. *v. a.* (from the noun) 1. To divide and adjust the hair (*Swift*). 2. To lay any thing consisting of filaments smooth, by drawing through narrow interstices; as, *to* comb *wool*.

COMB-BRUSH. *s.* A brush to clean combs.

COMB-MAKER. *s.* One whose trade is to make combs (*Mortimer*).

COMB-CUTTING MACHINE. Plate 33, explains the mechanism for cutting combs for which Mr. W. Bundy took out a patent in the year 1796. The general appearance of the machine is similar to that of a common turning lathe, of which the bed A has two puppets BG wedged on it, and is continued to hold a third, which supports a screw for the pivot of the arbor *a*. A large foot wheel and treadle is placed beneath the bed of the lathe, and by means of a band round its periphery, gives a rotatory motion to the pulley D, turning round on the pin fixed to the puppet B. E is a projecting board screwed to the top of the bed, and supported by brackets beneath; it has a straight brass bar screwed on each side of it, which forms a dovetailed groove for the block F, to slide in backwards and forwards without any shake; the board E has a frame shewn separately in fig. 2, screwed to it by four screws; it consists of the two nearly circular plates CC, connected by three pillars, so as to form a strong frame; these have each a hole in its

Comb Cutting.



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Colymbus Glacialis

Northern Diver.

Colymbus Immer

Imber

Colymbus Auritus

Eared Grebe

centre through which an arbor, fig. 5, passes; the end *h* of this arbor, which is pointed, turns in a hole in the end of the pin on which the pulley D turns, and the ends of the fork C are inserted into two holes in the pulley so that the arbor shall turn with it; the other end *d* turns in a hole in the end of a screw in the puppet C. A number of circular cutters, fig. 7, equal to the number of spaces between the teeth intended to be made in the comb, are fitted to this arbor, with a washer of the same thickness as the teeth of the comb, between each, when the arbor is filled with cutters, as in fig. 1, a nut is screwed on the end *d*, so as to pinch the cutters and washers between it, and a shoulder at the other end of the arbor to prevent their slipping round on the arbor. Fig. 4, is a triangular bar, on which are placed a number of pieces of steel, plate H, fig. 3, called guides, with a washer X between each, and fastened to their arbor by a screw, in the same manner as the cutters; when the machine is put together, the projecting part of these guides go into the spaces between the cutters, as in fig. 2, but do not touch the sides of the cutters. The pulley D has another *e* fastened to it, which turns by a band the pulley *f*, on whose arbor is an endless screw turning the wheel *g*, fixed on an arbor, which has a screw cut at the other end; it turns on screws put through cocks supported by the bed of the groove E, and the block F which slides over it is cut away so as to clear it, and has a lever in fig. 6 upon its face, with a piece of sharp steel plate on its under side that can be brought down upon the screw at pleasure, and acts as a nut there, being kept in that position by a latch *t*, or released by pushing in a thumb stud, and allowing a small spring *v* to lift it up. The piece of ivory intended to be cut into a comb is placed on the top of the block, fig. 6, with its back against the straight ruler *y*; a cover is then screwed over it to hold it fast, as in fig. 1, the operator turns the machine by his foot, and pushes the block forward in the groove till the edge of the lever *m* meets the end of the screw on the arbor of the wheel *g*, which is turning round, and advances the block with the comb towards the cutters, the comb being supported by the guides H, and the cutters saw out the spaces between the teeth. When the comb is finished, the workman presses the thumb stud of the latch *t*, and the spring *v* throws up the lever; the block is now released from the screw, and can be drawn back to remove the comb. For cutting combs of a different length of tooth, the ruler *y*, fig. 6, can be made to move parallel to itself by two screws in the face of the block, so that the comb shall project more or less from the block. The teeth of the combs thus cut, are pointed by another arbor of cutters, and turned by a band going round another pulley on the arbor of the foot wheel; these cutters are somewhat wider than the others, the combs are held to these, first on one side then on the other till the points are finished; this is done to one comb while the teeth are cutting in another.

To CO'MBAT. *v. n.* (*combattre*, French.) 1. To fight (*Shakspeare*). 2. To act in opposition (*Milton*).

To Co'mbat. *v. a.* To oppose (*Granville*).

Co'mbat. *s.* Contest; battle; duel; strife; opposition (*Dryden*).

Combat, in a general sense, denotes an engagement, or a difference decided by arms.

Combat, in our ancient law, was a formal trial of some doubtful cause or quarrel, by the swords or bastons of two champions. This form of proceeding was very frequent, not only in criminal but in civil causes; being built on a supposition that God would never grant the victory but to him who had the best right. The last trial of this kind in England was between Donald lord Ray appellant, and David Ramsay, esq. defendant, when, after many formalities, the matter was referred to the king's pleasure.

Combat is also applied to the solemn games of the ancient Greeks and Romans; particularly those of running, wrestling, boxing, &c.

CO'MBATANT. *s.* (*combattant*, French.) 1. He that fights with another; antagonist. 2. A champion (*Locke*).

CO'MBER. *s.* (from *comb.*) He whose trade is to disentangle wool, and lay it smooth for the spinner.

Co'mber, in ichthyology. See Labrus.

CO'MBINATE. *a.* (from *combine.*) Betrothed; promised (*Shakspeare*).

COMBINA'TION. *s.* (from *combine.*) 1. Union for some certain purpose; association; league (*Shakspeare*). 2. Union of bodies, or qualities; commixture; conjunction (*Boyle. South*). 3. Copulation of ideas in the mind (*Locke*).

Combination, in chemistry, denotes the intimate union of two or more bodies of different natures, from which a new compound body or substance results, differing in its nature from either of the constituents. Thus an acid united with an alkali, furnishes an instance of combination. Thus also sulphur and lime may by heat be united and form a compound, the properties of which are totally dissimilar to those of either the substances used. In both cases an affinity has been exerted between the substances, and they have combined. Combination is to be distinguished from mixture, in which dissimilar particles are blended together, without being united by attraction, in which no new qualities are acquired, in which the difference of parts is easily discovered, and these parts are capable of being separated by mechanical means. See Affinity, Mixture, and Chemistry.

COMBINATIONS, in mathematics, denote the alternations or variations, of any number of quantities, letters, or the like, in all possible ways. The number of possible combinations of the 24 letters, taken first two by two, then three by three, &c. according to Prestet's calculation, are

1391724288887252999425128493402200.

And father Truchet has shewn, that two

square pieces, each divided diagonally by two colours, may be combined 64 different ways, so as to form so many different kinds of chequer work; a fact which may be of use to paviours. See PAVEMENTS *tessellated*.

We shall add two propositions, which contain the most useful part of the doctrine of combinations.

I. Having given any number of things, with the number in each combination; to find the number of combinations.

1. When only two are combined together.

One thing admits of no combination.

Two *a* and *b*, admit of one only, viz. *ab*.

Three, *a*, *b*, *c*, admit of three, viz. *ab*, *ac*, *bc*.

Four admit of six, viz. *ab*, *ac*, *ad*, *bc*, *bd*, *cd*.

Whence it appears that the numbers of combinations, of two and two only, proceed according to the triangular numbers 1, 3, 6, 10, 15, &c. which are produced by the continual addition of the ordinal series 0, 1, 2, 3, 4, 5, &c. And if n be the number of things, then the general formula for expressing the sum of all their combinations by twos, will be $\frac{n.\overline{n-1}}{1.2}$

Thus, if $n=2$; this becomes $\frac{2.1}{2}=1$.

If $n=4$; it is $\frac{4.3}{2}$ . . . . $=6$, &c.

2. When three are combined together; then

Three things admit of one order, *abc*.

Four admit of 4; viz. *abc*, *abd*, *acd*, *bcd*.

Five admit of 10; viz. *abc*, *abd*, *abe*, *acd*, *ace*, *ade*, *bcd*, *bce*, *bde*, *cde*. And so on according to the first pyramidal numbers 1, 4, 10, 20, &c. which are formed by the continual addition of the former, or triangular numbers 1, 3, 6, 10, &c. And the general formula for any number n of combinations, taken by threes, is $\frac{n.\overline{n-1}.\overline{n-2}}{1.2.3}$.

So, if $n=3$; it is $\frac{3.2.1}{1.2.3}=1$.

If $n=5$; it is $\frac{5.4.3}{1.2.3}=10$, &c.

Proceeding thus, it is found that a general formula for any number n of things, combined by m at each time, is $s=\frac{n.\overline{n-1}.\overline{n-2}.\overline{n-3}, \&c.}{1.\quad 2.\quad 3.\quad 4.\ \&c.}$, continued to m factors, or terms, or till the last factor in the denominator be m.

3. By adding all these series together, their sum will be the whole number of possible combinations of n things combined both by twos, by threes, by fours, &c. And as the said series are evidently the coefficients of the power n of a binomial, wanting only the first two 1 and n; therefore the said sum, or whole number of all such combinations, will be $\overline{1+1}^n-n-1$, or 2^n-n-1. Thus if the number of things be 5; then $2^5-5-1=32-6=26$.

II. To find the number of changes and alterations which any number of quantities can undergo, when combined in all possible varieties of ways, with themselves and each other, both as to the things themselves, and the order or position of them.

One thing admits but of one order or position.

Two things may be varied four ways; thus, *aa*, *ab*, *ba*, *bb*.

Three quantities, taken by twos, may be varied nine ways; thus *aa*, *ab*, *ac*, *ba*, *ca*, *bb*, *bc*, *cb*, *cc*.

In like manner four things, taken by twos, may be varied 4^2 or 16 ways; and, in general, n things, taken by twos, may be changed or varied n^2 different ways.

For the same reason, when taken by threes, the changes will be n^3; when taken by fours, they will be n^4; and so generally, when taken by n's, the changes will be n^n.

Hence, then, adding all these together, the whole number of changes, or combinations in n things, taken by 2's, by 3's, &c. to n's, will be the sum of the geometrical series $n+n^2+n^3+n^4 \text{----} n^n$, which sum is $=\frac{n^n-1}{n-1}\times n$.

For example, if the number of things n be 4; this gives $\frac{4^4-1}{4-1}\times 4=\frac{255}{3}\times 4=340$.

And if n be 24, the number of letters in the alphabet; the theorem gives a result corresponding exactly with that of Prestet, as stated at the beginning of this article.

COMBINATORY MUSIC. See COMPOSITION.

To COMBI'NE. *v. a.* (*combiner*, French.) 1. To join together (*Milton*). 2. To link in union (*Shakspeare*). 3. To agree; to accord (*Shakspeare*).

To COMBI'NE. *v. n.* 1. To coalesce; to unite with each other (*Shakspeare*). 2. To unite in friendship or design (*Dryden*).

CO'MBLESS. *a.* (from *comb*.) Wanting a comb or crest (*Shakspeare*).

COMB-MARTIN, a town in Devonshire, with a market on Tuesdays. It is seated on an inlet of the Bristol channel. Lat. 51. 13 N. Lon. 4. 2 W.

COMBRE'TUM. In botany, a genus of the class octandria, order monogynia. Calyx four or five-toothed, campanulate, superior; corol four or five-petalled, inserted into the calyx; stamens very long; seed one, with four or five membranaceous angles. Five species; natives of the East or West Indies; some branchy shrubs; others, trees with climbing branches and whitish flowers.

COMBUST, in astronomy, is applied to a planet when it is not more than the distance of sixteen minutes from the sun's disc.

COMBU'STIBLE. *a.* (*combustum*, Lat.) Having the quality of catching fire; susceptible of fire (*South*).

COMBU'STIBLENESS. *s.* Aptness to take fire.

COMBUSTIO. (*combustio*, from *comburo*, to burn.) A burn or scald.

COMBUSTIO PECUNIÆ, the ancient way

of trying mixed and corrupt money, by melting it down upon payments into the exchequer. In the time of king Henry II. a constitution was made, called the trial by combustion; the practice of which differed little or nothing from the present method of assaying silver.

COMBU'STION. *s.* 1. Conflagration; burning; consumption by fire (*Burnet*). 2. Tumult; hurry; hubbub (*Addison*).

Combustion, in chemical and natural philosophy, a term which denotes the decomposition of certain substances accompanied by light and heat. The process of combustion, the various phænomena it exhibits, its astonishing effects, its infinite uses, and its devastations, have at all times rendered it a most important object of human attention.

When a stone or a brick is heated, it undergoes no change except an augmentation of temperature; and when left to itself, it soon cools again, and becomes as at first. But with combustible bodies the case is very different. When heated to a certain degree in the open air, they suddenly become much hotter of themselves; continue for a considerable time intensely hot, sending out a copious stream of caloric and light to the surrounding bodies. This emission, after a certain period, begins to diminish, and at last ceases altogether. The combustible has now undergone a most complete change; it is converted into a substance possessing very different properties, and no longer capable of combustion. Thus when charcoal is kept for some time at the temperature of about 800°, it kindles, becomes intensely hot, and continues to emit light and caloric for a long time. When the emission ceases, the charcoal has all disappeared, except an inconsiderable residuum of ashes; being almost entirely converted into carbonic acid gas, which makes its escape, unless the experiment is conducted in proper vessels. If it is collected, it is found to exceed greatly in weight the whole of the charcoal consumed.

The first attempt to explain combustion was crude and unsatisfactory. A certain elementary body, called fire, was supposed to exist, possessed of the property of devouring certain other bodies, and converting them into itself. When we set fire to a grate full of charcoal, we bring, according to this hypothesis, a small portion of the element of fire, which immediately begins to devour the charcoal, and to convert it into fire. Whatever part of the charcoal is not fit for being the food of fire is left behind in the form of ashes.

A much more ingenious and satisfactory hypothesis was proposed in 1665 by Dr. Hooke. According to this extraordinary man, there exists in common air a certain substance, which is like, if not the very same with, that which is fixed in saltpetre. This substance has the property of dissolving all combustibles; but only when their temperature is considerably raised. The solution takes place with such rapidity, that it occasions both heat and light, which in his opinion are mere notions.

About ten years after the publication of Hooke's Micrographia, his theory was adopted by Mayow, without acknowledgment, in a tract which he published at Oxford on saltpetre. We are indebted to him for a number of very ingenious and important experiments, in which he anticipated several modern chemical philosophers; but his reasoning is for the most part absurd, and the additions which he made to the theory of Hooke are exceedingly extravagant. To the solvent of Hooke he gives the name of spiritus nitro-aereus. It consists, he supposes, of very minute particles, which are constantly at variance with the particles of combustibles, and from their quarrels all the changes of things proceed. Fire consists in the rapid motion of these particles, heat in their less rapid motion. The sun is merely nitro-aerial particles moving with great rapidity. They fill space. Their motion becomes more languid according to their distance from the sun; and when they approach near the earth, they become pointed, and constitute cold.

The attention of chemical philosophers was soon drawn away from the theory of Hooke and Mayow, to one of a very different kind, first proposed by Beccher, but new-modelled by his disciple Stahl with so much skill, arranged in such an elegant systematic form, and furnished with such numerous appropriate and convincing illustrations, that it almost instantly caught the fancy, raised Stahl to a high rank among philosophers, and constituted him the founder of the Stahlian theory of combustion.

The manner in which the philosophers who adopted the doctrine of that celebrated man explained combustion was the more seducing, as the cause on which they made this phænomenon depend was presented under the appearance of a mechanical cause. The moleculæ of elementary fire, or phlogiston, were lodged in those of the body as in so many little covers or wrappers, where they experienced a compression similar to that of a bent spring. In combustion, the fire escaping in consequence of its expansive force, the particles by which the deflagration is commenced impress upon the neighbouring particles a stroke or jolt which occasions their rupture by the unbending or expansion of the fire which they concealed; and thus the commotion, and, by a necessary consequence, the conflagration would be communicated from one particle to another through the whole mass. The air would contribute to maintain and to accelerate the action of the fire, by re-acting contrary to it, and by opposing to its dissipation an obstacle which would concentrate its action into a smaller space, and thus augment its energy.

But the discoveries of modern chemists, and especially those of Lavoisier, have entirely changed the point of view under which combustion should be contemplated. They have endeavoured to demonstrate, that this combustion consists in a combination of the proper moleculæ of a body with those of the oxygen which that body takes up from the surrounding air, accompanied by the disengagement of light and of caloric, which retained the oxygen in

the state of an elastic fluid. This doctrine has caused phlogiston to disappear, as being at least useless; and the atmospheric air, which was regarded as a simple stimulant, with respect to combustion, furnishes the principle which is the chief and immediate agent.

The subject of combustion is, however, a very difficult one, respecting which opinions are still afloat: the theory of the eminent yet unfortunate Lavoisier, though adopted by the generality of chemists both continental and English, is far from satisfactory. It is true, that he has corrected the errors of several of his predecessors, and has advanced one very important step before them; but many additional steps are requisite to render the theory complete. It explains satisfactorily why the burning body gradually wastes away during the process of combustion; but it furnishes no explanation of the constant emission of heat and light, though this is a circumstance quite as worthy of attention as the wasting of the body. Indeed the French chemists have attached a new meaning to the term combustion, having made it stand for the general combination of a body with oxygen; but Dr. Thomson of Edinburgh, who has lately extended and improved the theory of Lavoisier, employs the term in the sense usually affixed to it by the generality of mankind. When a body undergoes combustion, two things, as this philosopher remarks, take place. 1. The body gradually wastes away, and often disappears altogether; it being then said to be consumed or burnt. 2. During the whole of this process it emits heat and light; the heat and light thus emitted are usually denominated fire; and the waste of the body is considered as the effect or consequence of its combustion. Hence, a true theory of combustion must satisfactorily account for these two things; namely, the change which the body undergoes, and the emission of heat and light which accompanies this change.

Dr. Thomson thinks that, as far as combustion is concerned, bodies may be arranged under three classes: viz. 1. Combustibles. 2. Supporters of combustion. 3. Incombustibles. In his theory it is supposed that the light of combustion is furnished by the combustible body, and the heat by the oxygen of supporters; but that products convert combustibles into products by mere oxygenation without combustion. The leading positions are, that light is originally an ingredient of combustibles, and heat of oxygen. As the author completely establishes the facts on which his reasoning rests, there can probably be only one plausible objection urged against it. Why is not the caloric of the oxygen separated when that gas combines with bodies destitute of light? It is incontrovertible that caloric is emitted on many occasions, when no light appears with it. However, should it be a fact that the matter of light is chemically combined with all bodies which emit heat, though it does not fly off until the heat becomes great, a thing which is not improbable, Dr. Thomson's theory will seem to be established; and thus not only complete the theory of Lavoisier, but afford an easy solution to some phenomena which have been thought inconsistent with that theory.

Still it must be acknowledged that this is a very obscure subject; the reader would, therefore, do well, before he forms a decisive opinion, to trace the progressive improvement of the theory in the hands of Boyle, Hooke, Mayow, Becher, Stahl, Scheele, Kirwan, Black, Crawford, Lavoisier, Brugnatelli, and Thomson; with a view to which he may advantageously consult the article combustion in Dr. G. Gregory's Encyclopædia, and in the Supplement to the Encyclopædia Britannica; Robison's Life of Dr. Black; the Edinburgh Review, No. 5; Nicholson's Journal, N. S. vol. ii. Nicholson's, Accum's, and Thomson's Chemistry.

Combustion (Spontaneous). This as a general fact is well known, and the more common causes are too obvious to be enlarged upon; we need only refer to friction and its effects, to the heat produced by the slacking of lime when in contact with combustible matter, to the fermentation of hay, of dunghills, and of similar materials similarly disposed.

But besides these more common causes, experience has shewn that many vegetable substances, highly dried and heaped together, will heat, scorch, and at last burst into flame. Of these the most remarkable is a mixture of the expressed oil of the farinaceous seeds, as rape or linseed oil, with almost any other dry vegetable fibre, such as hemp, cotton, matting, &c. and still more, if also united with lamp black, or any carbonaceous substance. These mixtures if kept for a time undisturbed in close bundles, and in a warm temperature, even in small quantities, will often heat, and burn with a mouldering fire for some hours, and if air be admitted freely, will then burst into flame. To this without doubt may be attributed several accidental conflagrations in storehouses, and places where quantities of these substances are kept, as has been proved by direct experiments. The most important of these experiments were made by Mr. George, and a committee of the Royal Academy at Petersburgh in the year 1781, in consequence of the destruction by fire of a frigate in the harbour of Cronstadt; the conflagration of a large hemp magazine in the same place in the same year; and a slight fire on board another frigate, in the same port, in the following year.

These accidents led to a very strict examination of the subject by the Russian government; when it came out, that at the time of the second accident, several parcels of matting, tied with packthread, in which the soot of burnt fire-wood had been mixed with oil, for painting the ship, had been lying some time on the floor of the cabin whence the fire broke out. In consequence of which, the following experiments were made: forty pounds of fir-wood soot were soaked with about thirty-five pounds of hemp oil varnish, and the whole was wrapped up in a mat, and put in a close cabin. In about sixteen hours it was observed to give out

a smoke, which rapidly increased, and when the door was opened, and the air freely admitted, the whole burst into a flame. Three pounds of fir-black were mixed with five pounds of hemp-oil varnish, and the whole bound up in linen, and shut up in a chest. In sixteen hours it emitted a very nauseous putrid smell and steam; and two hours afterwards it was actually on fire, and burnt to ashes. In another experiment, the same occurrences took place, but not till the end of forty-one hours after the mixture had been made; and in these and many similar experiments, they all succeeded better, and kindled sooner on bright, than on rainy days. Chimney soot used instead of lamp black did not answer, nor was any effect produced, when oil of turpentine was substituted for the hemp or rape-oil. In general, it was found, that the accension took place more readily with the coarser and more unctuous fir-black, than with the finer sorts, but the proportions of the black to the oil did not appear to be of any great moment. Sometimes in wet weather, these mixtures only became hot for some hours, and then cooled again, without actually taking fire.

In all these cases, the soot or black was from wood, and not coal. The presence of lamp-black, or any other dry carbonaceous matter, is not necessary, however; for a spontaneous inflammation will take place in hemp or cotton, simply soaked in any of these expressed oils, when in considerable quantity, or under circumstances favourable to this process, as in very hot weather, or closely shut up. An accident of this sort happened at Gainsborough in Lincolnshire, in July 1794, with a bale of yarn of 120lb. accidentally soaked in rape-oil, which after remaining in a warehouse for several days, began to smoke, to emit a most nauseous smell, and finally to burst out in a most violent flame. A similar accident with a very small quantity of the materials, happened at Bombay. A bottle of linseed-oil had been left standing on a chest; this had been thrown down by accident in the night, the oil run into a chest which contained some coarse cotton cloth, and in the morning the cloth was found scorching hot, and reduced nearly to tinder, and the wood of the chest charred on the inside. On subsequent trial, a piece of the same cloth was soaked in oil, shut up in a box, and in no longer time than three hours, it was found scorching hot, and on opening the cloth it burst into fire. Similar to this is the spontaneous combustion of wool, or woollen yarn, which has occasionally happened when large quantities have been kept, heaped up in rooms little aired, and in hot weather. The oil with which wool is dressed, which is generally rape-oil, appears the chief agent in this combustion. Even high dried, oily, or farinaceous matter of any kind, will alone take fire, when placed in circumstances very favourable to this process. Rye flour roasted till half parched, and of the colour of coffee, and wrapped up in a linen cloth, has been found to heat violently, and to destroy the cloth. Wheat flour, when heated in large quantities, and highly dried, has been known to take fire in hot weather, causing accidents in granaries and bakers shops. An accident of this kind is related by count Morrozzo, in the Memoirs of the Turin Academy, to have happened at a flour warehouse at Turin, containing about three hundred sacks of flour. It began by a violent explosion on a lamp being brought into the warehouse, and the whole was soon after in flames. Charcoal alone also has been known to take fire in powder mills, when quantities of it in powder have been kept for some time closely packed. Another, and totally different species of spontaneous combustion, is that which occurs during the oxygenation or vitriolization of pyrites, or sulphurets of iron, copper, &c.

A most curious, and if not well authenticated, a scarcely credible species of spontaneous inflammation, is that in a few rare instances known to occur in the human body. It is not quite certain indeed whether the first inflammation has been quite spontaneous, or caused by the approach of a lighted substance; but in these melancholy accidents, the body of the unfortunate sufferers has been brought to a state of such high combustibility, that the flame once kindled, has gone on without other fuel, to the entire destruction of every part, (the bones and extremities excepted) and, as it appears, has been attended with actual flame, of a lambent faint light. This change is the more remarkable, as the human body in all its usual states, both of health and disease, is scarcely at all of itself combustible, and cannot be reduced to ashes without the assistance of a very large pile of faggots, or other fuel, as universal experience in the very ancient mode of sepulture, and the history of martyrdoms, abundantly shews. Cases of this human combustion on record, have occurred in different countries. Two of them, well authenticated, are recorded in the Philosophical Transactions, and occurred in England, and a few others in Italy, France, and elsewhere. In all but one, the subjects of them have been females rather advanced in life, of indolent habits, and apparently much addicted to spirituous liquors.

The accident has generally been detected by the penetrating fetid smell of burning and sooty films, which have spread to a great distance, and the sufferers have in every instance been discovered dead, and with the body more or less completely burnt up, leaving in the burnt parts only an oily, crumbly, sooty, and extremely fetid matter. Another circumstance in which these cases all agree, is the comparative weakness of the heat produced by this combustion, notwithstanding the very complete disorganization of the body itself, so that the furniture of the room, wooden chairs, &c. which were found within the reach of the burning body, were in many instances absolutely unhurt, and in others only scorched; the heat not having been strong enough to set them on fire. It is impossible to give an adequate reason for this remarkable change, nor does it seem before the very time of the acciden. to have produced any

very sensible alteration in the appearance and functions of the body, which is certainly a most astonishing circumstance. With regard to the effect which the use of ardent spirits is supposed to have in this case, it is impossible not to imagine that this cause may contribute largely to this change; but the instances of the abuse of spirits are so innumerable, and those of this surprising combustion are so extremely rare, that very little satisfaction can be obtained from this explanation.

To COME. *v. n.* pret. *came*, particip. *come*. (coman, Saxon; *komen*, Dutch.) 1. To remove from a distant to a nearer place; to arrive: opposed to *go* (*Knolles*). 2. To draw near; to advance toward (*Shakspeare*). 3. To move in any manner toward another (*Locke*). 4. To proceed; to issue (*Samuel*). 5. To advance from one stage or condition to another (*Dryden*). 6. To be brought to some condition either for better or worse (*Swift*). 7. To attain any condition (*Ben Jonson*). 8. To become (*Shakspeare*). 9. To arrive at some act or habit (*Locke*). 10. To change some one state into another desired (*Bacon*). 11. To become present, and no longer future (*Dryden*). 12. To become present, and no longer absent (*Pope*). 13. To happen to fall out (*Shakspeare*). 14. To follow as a consequence (*Shakspeare*). 15. To cease very lately from some act or state (*Samuel*). 16. *To* COME *about*. To come to pass; to fall out; to come into being (*Shakspeare*). 17. *To* COME *about*. To change; to come round (*Ben Jonson*). 18. *To* COME *again*. To return (*Judges*). 19. *To* COME *after*. To follow (*Matthew*). 20. *To* COME *at*. To reach; to obtain (*Addison*). 21. *To* COME *by*. To obtain; to gain (*Shakspeare*). 22. *To* COME *in*. To enter (*Locke*). 23. *To* COME *in*. To comply; to yield (*Spenser*). 24. *To* COME *in*. To become modish; to be brought into use (*Atterbury*). 25. *To* COME *in*. To be an ingredient (*Atterbury*). 26. *To* COME *in*. To accrue from an estate, or otherwise, as gain (*Suckling*). 27. *To* COME *in*. To be gained in abundance (*Shakspeare*). 28. *To* COME *in for*. To be early enough to obtain (*Collier*). 29. *To* COME *in to*. To join with; to bring help (*Bacon*). 30. *To* COME *in to*. To comply with; to agree to (*Atterbury*). 31. *To* COME *near*. To approach; to resemble in excellence (*Ben Jonson*). 32. *To* COME *of*. To proceed, as a descendant from ancestors (*Dryden*). 33. *To* COME *of*. To proceed, as effects from their causes (*Locke*). 34. *To* COME *off*. To deviate; to depart from a rule or direction (*Bacon*). 35. *To* COME *off*. To escape (*South*). 36. *To* COME *off*. To end an affair (*Shakspeare*). 37. *To* COME *off from*. To leave (*Felton*). 38. *To* COME *on*. To advance; to make progress (*Bacon. Knolles*). 39. *To* COME *on*. To advance to combat (*Knolles*). 40. *To* COME *on*. To thrive; to grow big; to grow (*Bacon*). 41. *To* COME *over*. To revolt (*Addison*). 42. *To* COME *over*. To rise in distillation (*Boyle*). 43. *To* COME *out*. To be made publick (*Dryden*). 44. *To* COME *out*. To appear upon trial; to be discovered (*Arbuthnot*). 45. *To* COME *out with*. To give vent to (*Boyle*). 46. *To* COME *to*. To consent or yield (*Swift*). 47. *To* COME *to*. To amount to (*Locke*). 48. *To* COME *to himself*. To recover his senses (*Temple*). 49. *To* COME *to pass*. To be effected; to fall out (*Boyle*). 50. *To* COME *up*. To make appearance (*Bacon*). 51. *To* COME *up to*. To amount to (*Woodward*). 52. *To* COME *up to*. To rise; to advance (*Shakspeare*). 53. *To* COME *up with*. To overtake. 54. *To* COME *upon*. To invade (*South*). 55. *To* COME. In futurity (*Locke*).

COME. A particle of exhortation. Be quick; make no delay (*Genesis*).

COME. A particle of reconciliation, or incitement to it (*Pope*).

COME, *s.* (from the verb.) A sprout: a cant term (*Mortimer*).

COME SOPRA, in music, signifies *as above*; these words are used, when the part just sung or played is to be repeated.

COME'DIAN. *s.* (from *comedy*.) 1. A player or actor of comic parts. 2. A player in general; a stage-player; an actress or actor (*Camden*). 3. A writer of comedies (*Peacham*).

COMEDONES. See CRINONES.

COMEDY, a dramatic piece, representing some agreeable and diverting transaction: or an allegorical representation of something in private life, for the amusement and instruction of the audience. There are those who derive the word comedy from *comus*, and who suppose that κωμωδειν is the same with *como digna canere*. This etymology appears to be the better founded, in that the first farces were exhibited at feasts, which have been since improved to comedies in their present state. In this sense, comedy is opposed to tragedy, the subjects whereof are grave, and the persons of higher rank.

Scaliger defines comedy, a dramatic poem, very busy, pleasant in the conclusion, and written in a popular style. Aristotle calls it an imitation of the worst, or, rather, of the lowest class of persons, by way of ridicule. This definition Corneille finds fault with, and maintains, that the actions of kings themselves may enter comedy, provided they be such as are not very momentous, nor attended with any considerable danger. He adds, that a poem wherein the greatest peril is the loss of a mistress, has no right to any higher appellation than that of comedy. Comedy may, we think, be properly defined a sort of dramatic poetry, which gives a view of common and private life, recommends virtue, and corrects the vices and follies of mankind by means of ridicule. (See the article POETRY). This last kind alone was received among the Romans, who nevertheless made a new subdivision of it into ancient, middle, and new, according to the various periods of the commonwealth. Among the ancient comedies were reckoned those of Livius Andronicus; among the middle those of Pacuvius; and among the new ones, those of Terence. They likewise distinguished comedy according

to the quality of the persons represented, and the dress they wore, into togatæ, prætextatæ, trabeatæ, and tabernariæ, which last agrees pretty nearly with our farces. Among us, comedy is distinguished from farce, as the former represents nature as she is; the other distorts and overcharges her. They both paint from the life, but with different views: the one to make nature known, the other to make her ridiculous. (*English Ency*.).

With regard to the English comedy, its character under the hands of Shakspeare, Jonson, Fletcher, and Massinger, is well known. It at that time excelled all others in strength of character, and in the true expression of nature. The real character of English comedy, however, was assumed after the commonwealth, when it revived in the reign of Charles II.; but the stage was then too faithful a mirror of his licentious court. The comedies of Dryden are tinged with this alloy: indeed in other respects they add little honour to the name of that poet. Those of Otway are too obscene to be acted, or even read. The comic muse of Congreve has been equally blamed for licentiousness and for exuberance of wit. The latter reproach may perhaps justly apply to the best comic productions of the present age.

Comedy has been divided into three kinds, according to the ends which it proposes. By pourtraying vice, it renders it contemptible, as tragedy renders crime odious: this is characteristic comedy. When men are represented as the sport of fortune it is called incidental comedy. When the domestic virtues are drawn in amiable colours, and in situations where misfortune renders them interesting, it may be termed sentimental comedy.

The first of these is the most useful to manners, and at the same time the strongest, the most difficult, and of course the rarest. It traces vice to its source; it attacks it in its principle; it presents the mirror to mankind, and makes them blush at their own image. Hence it supposes in its author a consummate knowledge of human nature, a prompt and accurate discernment, and a vigour of fancy which seizes at once what penetration could not comprehend in detail.

Incidental comedy is perhaps the most successful and popular, as it keeps the attention continually awake by lively and unexpected changes, and as it furnishes a source of amusement and mirth when the sallies of wit might fail in their effect by too frequent recurrence, if not relieved by such aid.

Sentimental comedy is perhaps more useful to morals than even tragedy, as it excites a deeper interest, because the examples it holds forth affect us more nearly. But as the style of comedy can neither be sustained by the grandeur of objects, nor animated by the strength of incident and situation, as it should be at the same time familiar and interesting, there are two different extremes to be avoided, of being cold and of being romantic. Simple nature is the true middle-path, and it is the highest effort of art to be at the same time artful and natural.

A style of comedy superior to these is that which unites characteristic with incidental comedy. Here the characters are involved by the foibles of the mind and the vices of the heart in the most humiliating cross purposes, which expose them to the laughter and contempt of the audience. A happier specimen of this style could not be found than in the School for Scandal.

Such are the three kinds of comedy. There are others, which we have purposely omitted to enumerate. First, that obscene comedy, which is no longer suffered on the stage but by a sort of prescription, and which cannot excite a smile without raising a blush; secondly, that drama of false sentiment, the offspring of the German school, which once threatened to destroy our taste for genuine comedy, but which has now happily passed into oblivion; and, lastly, that comedy of low fun and pantomime trick, the feeble resource of minds without genius, talent, or taste, which it is the disgrace of the British stage of the present day to bring forward, and the reproach of the British public to tolerate and encourage. (*British Ency*.).

CO'MELINESS. *s.* (from *comely*.) Grace; beauty; dignity (*Ray*).

CO'MELY. *a.* (from *become*.) 1. Graceful; decent (*South*). 2. Decent; according to propriety (*Shakspeare*).

CO'MELY. *ad.* (from the adjective.) Handsomely; gracefully (*Ascham*).

COMENIUS (John Amos), a learned grammarian, born in Moravia in 1592; and ordained pastor in 1616, at Fulnec, where also he superintended the seminary just erected for the education of youth. When the persecution broke out against the Protestants, he fled to Lesna, in Poland, and became schoolmaster. He there wrote his Janua Linguarum, which procured him so great a reputation that he was invited to Sweden and England, to reform the public schools; he chose the latter country, and arrived in London in 1641; but the kingdom was then in a political ferment, and he went to Sweden, where he was well received, and had a liberal allowance. He afterwards returned to Lesna, but was obliged to quit it when it was burnt by the Poles. After rambling from place to place, he came to Amsterdam, where he printed his new Method of Teaching. But by this time, he was become a visionary, and boldly undertook to prophesy future events, particularly the near approach of the millennium; which, according to him, was to happen in 1672; but he died the year before, so that he escaped the mortification that would have attended the disappointment. He was greatly esteemed by madame Bourignon, who visited him in his last sickness.

The Janua Linguarum is of itself sufficient to establish the reputation of Comenius. It is, says M. Chambaud, "A performance contrived with incredible art and pains to promote more effectually the learning of languages; it has been translated not only into all the languages of Europe, besides the Latin and Greek, but also into the Arabic, Turkish, Persian, and

even the Mogul's language; and has gone through a great many Polyglot editions. The ingenious author, in methodising all the works of nature and art, all that is the object of our senses and understanding, has not only brought under proper heads all the words and common constructions of a language, but also explained things and their differences: so that his performance is a compendious system of learning, altogether proper to form the minds of youth, and enrich them with knowledge, at the same time that they are learning languages. How it comes to pass that so valuable a book is now quite disused in schools, and known only to some men of letters, is indeed a matter of wonder."

Besides the Janua Linguarum, Comenius also published the Vestibulum, and the Orbis Pictus, both excellent works, and communicating instruction in the Latin language in an admirable manner. Unluckily these works are likewise fallen into disuse; though of the latter it has been said by an able judge, that it "is as far preferable to a common nomenclature, as an habitable building to a heap of loose stones in a quarry, or a burning candle to a dead mixture of grease and cotton."

CO'MER. *s.* (from *come.*) One that comes (*Bacon. Locke*).

COMET, a heavenly body, in the planetary region, appearing suddenly, and again disappearing; and during the time of its appearance moving in a proper, though very eccentric, orbit, like a planet.

The popular division of comets is into tailed, bearded, and hairy comets: though this division rather relates to the different circumstances of the same comet, than to the phenomena of several. Thus when the comet is westward of the sun, and sets after it, the comet is said to be tailed, because the train follows it in the manner of a tail: when the comet is eastward of the sun, and moves from it, the comet is said to be bearded, because the light marches before it in the manner of a beard. Lastly, when the comet and the sun are diametrically opposite (the earth between them), the train is hid behind the body of the comet, except a little that appears round it in form of a border of hair: and from this last appearance the word comet is derived; as κομητης, *cometa*, comes from κομη, *coma*, hair. But there have been comets whose disk was as clear, as round, and as well defined, as that of Jupiter, without either tail, beard, or coma.

Comets appear to advance directly towards the sun, as if they were going to fall into his body; and after having disappeared for some time in consequence of their proximity to that luminary, fly off again on the other side as fast as they came, projecting a tail much greater and brighter in their recess; but, getting daily at a farther distance from us in the heavens, they continually lose some of their splendour, and at last totally disappear. Their apparent magnitude is very different: sometimes they appear only of the bigness of the fixed stars; at other times they equal the diameter of Venus, and sometimes even of the sun or moon. In 1652, Hevelius observed a comet which seemed not inferior to the moon in size, though it was not so bright, but appeared with a pale and dim light. These bodies also sometimes lose their splendour suddenly, while their apparent bulk remains unaltered. With respect to their apparent motions, they have all the inequalities of the planets; sometimes seeming to go forwards, sometimes backwards, and sometimes to be stationary.

Comets, viewed through a telescope, have a very different appearance from any of the planets. The nucleus, or star, seems much dimmer. They are to appearance surrounded with atmospheres of a prodigious size, often rising ten times higher than the nucleus, and have often likewise different phases, like the moon.

Of all the celestial bodies, comets have given rise to the greatest number of speculations and conjectures. Their strange appearance has in all ages been a matter of terror to the vulgar, who uniformly have looked upon them to be evil omens and forerunners of war, pestilence, &c. Others, less superstitious, supposed them to be meteors raised in the higher regions of the air. But we find that some part of the modern doctrine concerning them had been received into the ancient Italic and Pythagorean schools; for they held them to be so far of the nature of planets, that they had their periodical times of appearing; that they were out of sight for a long time, while they were carried aloft at an immense distance from the earth, but became visible when they descended into the lower regions of the air, when they were nearer to us.

Aristotle asserted that the heavens were unchangeable, and not liable to generation or corruption. Comets therefore, which he believed to be generated when they first made their appearance, and destroyed when they vanished from our sight, he maintained, could not be heavenly bodies, but rather meteors or exhalations raised into the upper regions of the atmosphere, where they blazed out for a while, and disappeared when the matter of which they were formed was consumed.

Tycho Brahe first restored the comets to their true rank in the creation. Before his time several had been observed with tolerable exactness by Regiomontanus, Appian, Fabricius, and others; yet they all thought them below the moon. But Tycho, being provided with much better instruments, set himself with great diligence to observe the famous comet of 1577; and from many careful observations deduced that it had no sensible diurnal parallax; and therefore was not only far above the regions of our atmosphere, but much higher than the moon. But though few have come so near the earth as to have any diurnal parallax, all of them have what may be called an annual parallax; that is, the revolution of the earth in her orbit causes their apparent motion to be very different from what it would be if viewed from the sun: and this shows them to

be much nearer than the fixed stars, which have no such parallax. Kepler was also very attentive to the motions of the comets, and found that they did not move in straight lines, as had been supposed. He showed that their paths were concave towards the sun, and supposed them to move in parabolic trajectories.

That these bodies are not meteors in our air is manifest, because they rise and set in the same manner as the moon and stars. Many had gone so far in their inquiries concerning them, as to prove by their observations that they moved in the celestial spaces beyond the moon; but they had no notion of the path which they described. Now the power of the sun being reciprocally in the duplicate proportion of the distance, every body acted upon by him must either fall directly down, or move about him in one of the conic sections; viz. either the ellipsis, parabola, or hyperbola. If a body which descends towards the sun as low as the orbit of any planet, move with a swifter motion than the planet, it will describe an orbit of a more oblong figure than that of the planet, and have at least a longer axis. The velocity of the body may be so great, that it shall move in a parabola, so that having once passed the sun, it shall ascend for ever without returning, though the sun will still continue in the focus of that parabola; and with a velocity still greater, they will move in an hyperbola. It is, however, probable, that the comets move in very eccentric ellipses; and hence those bodies are sometimes found at a moderate distance from the sun, and appear within the planetary regions; at other times they ascend to vast distances, far beyond the orbit of Saturn, and become invisible. Still, if we admit that the orbits of comets are very eccentric ellipses, there are vast differences among them. Excepting Mercury, there are no great differences among the planets, either as to the eccentricity of their orbits, or the inclination of their planes; but the planes of some comets are almost perpendicular to others, and some of their ellipses are much wider than others. The narrowest ellipsis of any comet hitherto observed was that of 1680. There is also a much greater inequality in the motion of the comets than of the planets; the velocity of the former being incomparably greater in their perihelion than in their aphelion; but the planets are very little accelerated.

We cannot, however, positively assert that the orbits of all comets are ellipses. The comet that citizen Messier discovered in June 1770, upon which M. Burckhardt has made long and learned calculations, appears to have had an orbit almost circular, and that its periodical revolution was five years and seven months. Nevertheless, this comet has never been seen, either before or since the year 1770; which can hardly be attributed to any thing but some great change in its orbit. "Must we then," says M. Lalande, "after maintaining during the eighteenth century that all comets return after certain periodical revolutions, confess in the nineteenth century, that, excepting the one seen in 1759, they do not revolve?" Indeed it is probable that the hypothesis advanced by Mr. Cole in his Theory of Comets, is, though not always, yet often, accurate. He supposes that the orbit of a comet is not an ellipse; but that, when it passes its perihelion, it has acquired so great a velocity, that its centripetal force is overcome by its centrifugal, and that consequently the comet continues to fly off in a parabola or hyperbola, till it come within the attraction of some fixed star; that this attraction may give it a new direction, and increase its velocity till it come to an apsis below that star, when it may again fly off either in a parabola or hyperbola, and proceed till it fall within the attraction of another star; and thus visit many different systems. A similar opinion was started by the celebrated M. Lambert. For our own parts, we think it probable that future observations will prove that comets move sometimes in parabolic or hyperbolic orbits, as suggested by Mr. Cole, and in other cases in elliptical orbits: but we conceive it would be premature even to affirm that elliptical orbits are the most common.

We must here, though, mention the ingenious conjecture of Dr. Zach. "Why," says he, "may not comets appear sometimes luminous, at others dark? The comet of 1770, therefore, might exist sometimes in an opaque, and sometimes in a phosphorescent state; and hence, perhaps, and from the perturbative power of the larger and more dense bodies, the unfrequency of their return may be explained. They come back, and we do not see them; they are present, and we do not observe them." So that admitting this, it would follow, that although comets should all move in ellipses, they would not always be visible in their perihelia. And if the perturbations arising from other bodies be considered, it will appear that the same comet may sometimes move in one conic section, at others, in another.

Of the Magnitude of Comets.—The estimates that have been given of the magnitude of comets by Tycho Brahe, Hevelius, and some others, are not very accurate; as it does not appear that they distinguished between the nucleus and the surrounding atmosphere. Thus Tycho computes that the true diameter of the comet in 1577 was in proportion to the diameter of the earth, as 3 is to 14; and Hevelius made the diameter of the comet of 1652 to that of the earth, as 52 to 100. But the diameter of the atmosphere is often 10 or 15 times as great as that of the nucleus: the former, in the comet of 1682, was measured by Flamsteed, and found to be 2′, when the diameter of the nucleus alone was only 11 or 12″. Though some comets, estimated by a comparison of their distance and apparent magnitude, have been judged much larger than the moon, and even equal to some of the primary planets. The diameter of that of 1744, when at the distance of the sun from us, measured about 1′, which makes its diameter about three times that of the earth: at another time the diameter

of its nucleus was nearly equal to that of the planet Jupiter. But Dr. Herschel has observed several comets which he could not find had any solid nucleus. We present the doctor's reflections on this subject. "Many of the operations of nature are carried on in her great laboratory which we cannot comprehend; but now and then we see some of the tools with which she is at work. We need not wonder that their construction should be so singular as to induce us to confess our ignorance of the method of employing them, but we may rest assured that they are not mere lusus naturæ. I allude to the great number of small telescopic comets that have been observed; and to the far greater number still, that are probably much too small for being noticed by our most diligent searchers after them. Those six, for instance, which my sister has discovered, I can, from examination, affirm, had not the least appearance of any solid nucleus, and seemed to be mere collections of vapours condensed about a centre. Five more that I have also observed, were nearly of the same nature. This throws a mystery over their destination, which seems to place them in the allegorical view of tools, probably designed for some salutary purposes to be wrought by them; and, whether the restoration of what is lost to the sun by the emission of light, may not be one of these purposes, I shall not presume to determine. The motion of the comet discovered by M. Messier, in June, 1770, plainly indicated how much its orbit was liable to be changed by the perturbation of the planets; from which and the little agreement that can be found between the elements of the orbits of all the comets that have been observed, it appears clearly that they may be directed to carry their salutary influence to any part of the heavens."

Tails of Comets.—Various conjectures have been formed respecting the tails of comets; though it is acknowledged by all that they depend on the sun somehow or other; and for this plain reason, that they are always turned from him; but in what manner this is accomplished, we cannot easily determine. Appian, Tycho Brahe, and others, thought the tail was formed by the sun's rays transmitted through the nucleus of the comet, which they fancied transparent, and was there refracted as in a lens of glass, so as to form a beam of light behind the comet; but this cannot be the case, as well because the figure of a comet's tail does not answer to such a refraction, as that such refracted light would not be seen by a spectator placed sidewise to it, unless it fell upon some substance sufficiently dense to cause a reflection. Des Cartes and his followers were of opinion, that the tail of a comet was owing to the refraction of its head: but if this were the case, the planets and principal fixed stars must have tails also; for the rays from them pass through the same medium as the light from the comets. Sir Isaac Newton was of opinion, that the tail of the comet is a very thin vapour which the head sends out by reason of its heat: that it ascends from the sun just as smoke does from the earth: that as the ascent of smoke is caused by the rarefaction of the air wherein it is entangled, causing such air to ascend and carry the smoke up with it; so the sun's rays acting upon the coma or atmosphere of the comet, do by rarefaction and refraction heat the same: that this heated atmosphere heats, and by heating rarefies the ether that is involved therein; and that the specific gravity with which such ether tends to the sun is so diminished by its rarefaction, that it will now ascend from him by its relative lightness, and carry with it the reflecting particles whereof the tail is composed.

M. Euler, Mem. Berlin, tom. ii. p. 117, thinks there is a great affinity between the tails of comets, the zodiacal light, and the aurora borealis, and that the common cause of all of them, is the action of the sun's light on the atmospheres of the comets, of the sun, and of the earth. He supposes that the impulse of the rays of light on the atmosphere of comets, may drive some of the finer particles of that atmosphere far beyond its limits; and that this force of impulse combined with that of gravity towards the comet, would produce a tail, which would always be in opposition to the sun, if the comet did not move. But the motion of the comet in its orbit, and about an axis, must vary the position and figure of the tail, giving it a curvature, and deviation from a line joining the centres of the sun and comet; and that this deviation will be greater, as the orbit of the comet has the greater curvature, and as the motion of the comet is more rapid. It may even happen, that the velocity of the comet, in its perihelion, may be so great, that the force of the sun's rays may produce a new tail, before the old one can follow; in which case the comet might have two or more tails. The possibility of this is confirmed by the comet of 1744, which was observed to have several tails while it was in its perihelion.

Dr. Hamilton urges several objections against the Newtonian hypothesis; and concludes that the tail of a comet is formed of matter which has not the power of refracting or reflecting the rays of light; but that it is a lucid or self-shining substance: and from its similarity to the aurora borealis, that it is produced by the same cause, and is properly an electrical phenomenon. Dr. Halley too seemed inclined to this hypothesis, when he said, that the streams of light in an aurora borealis so much resembled the long tails of comets, that at first sight they might well be taken for such: and that this light seems to have a greater affinity to that which the effluvia of electric bodies emit in the dark. Philos. Trans. No. 347. Hamilton's Philos. Essays, p. 91.

To determine the Place and Course of a Comet.—Observe the distance of the comet from two fixed stars, whose longitudes and latitudes are known: then from the distances thus known, calculate the place of the comet by spherical trigonometry.

Longomontanus shews an easy method of finding and tracing out the places of a comet

mechanically, which is, to find two stars in the same line with the comet, by stretching a thread before the eye over all the three; then do the same by two other stars and the comet: this done, take a celestial globe, or a planisphere, and draw a line upon it first through the former two stars, and then through the latter two; so shall the intersection of the two lines be the place of the comet at that time. If this be repeated from time to time, and all the points of intersection connected, it will shew the path of the comet in the heavens.

The circumstance which seems to be peculiar only to comets, that some of them move retrograde, while all the planets move direct, is only apparent. The reader is referred to the explanation which Laplace and Lalande have given of this point, in regard to the retrograde satellites of Herschel. Lalande says the word retrograde imposes by its expression, but in reality is nothing. Kant conjectured, long ago, that the retrograde motion of some comets might be only an optical illusion, like that of the geocentric motion of the planets.

M. Fatio has suggested, that some of the comets have their nodes so very near the annual orbit of the earth, that if the earth should happen to be found in that part next the node, at the time of a comet's passing by; as the apparent motion of the comet will be incredibly swift, so its parallax will become very sensible; and the proportion thereof to that of the sun will be given: whence, such transits of comets will afford the best means of determining the distance of the earth and sun.

It is by no means impossible, nor quite improbable, that in the course of many ages, a comet may actually meet one of the planets. The effect of such a concourse must be dreadful; a change of the axis of diurnal rotation must result from it, and the sea must desert its former bed and overflow the new equatorial regions. The shock and the deluge must destroy all the works of man, and most of the race. The remainder, reduced to misery, must long struggle for existence, and all remembrance of former arts and events must be lost, and every thing must be invented anew. There are not wanting traces of such devastations in this globe: strata and things are now found on mountain tops which were certainly at the bottom of the ocean in former times; remains of tropical animals and plants are now dug up in the circumpolar regions. *Tempora mutantur, et nos mutamur in illis.* It must be observed, though, that comets pass so rapidly when near us, that the effect of their attraction is not to be feared. It is only by actually striking the earth that they could produce the dreadful effect: but the shock, though possible, is so very improbable in the course of a man's life; it would require so extraordinary a chance for the concurrence of two bodies so small with respect to the immensity of the space in which they move, that no reasonable ground of fear can be maintained on this account.

After all that has been done and written on the subject of comets, we must confess that our knowledge of these wandering bodies is very imperfect. But we hope the unequalled vigilance and skill of the modern astronomers, will remove the obstacles which lie in this department of their science. "It appears to me," says Lalande, "that almost every thing depends on comets. The only thing that I recommend to my correspondents, is to look after, and attend to, comets: the knowledge of comets is alone wanting to complete the science of astronomy." History of Astron. for 1801. On this subject consult de la Caillé's, D. Gregory's, O. Gregory's, Vince's, and Whiston's Astronomy; Pingre's Cométographie, sir H. Englefield on Comets, and Hutton's Math. and Phil. Dict. art. Comet.

For the elements of the comet of 1807, see the article ASTRONOMY in this work: to which we may now add, that according to Dr. Herschel, the diameter of that comet is 538 miles.

COMETARIUM, a curious machine, exhibiting an idea of the revolution of a comet about the sun It is contrived in such a manner, as by elliptical wheels to shew the unequal motion of a comet in every part of its orbit. The comet is represented by a small brass ball, carried by a wire, in an elliptic groove about the sun in one of its foci; and the years of its period are shewn by an index moving with an equable motion over a graduated silver circle. See a particular description, with a cut, in Ferguson's Astron. 8vo. p. 412.

The construction of the cometarium has been recently improved by Mr. W. Jones, optician, Holborn.

CO'METARY. COME'TICK. *a.* (from *comet.*) Relating to a comet (*Cheyne*).

COMETEAU, a town of Saltz, in Bohemia, which was taken by storm, in 1421, and all the inhabitants, men, women, and children, were put to the sword. It is 65 miles N.W. of Prague. Lat. 50. 30 N. Lon. 13. 25 E.

COME'TES. In botany, a genus of the class tetandria, order monogynia. Involucre four-leaved, three-flowered; calyx four-leaved; capsule three-grained. One species only; a native of Surat: with herbaceous stem, opposite leaves, sessile, obovate, entire; peduncles axillary, alternate, solitary, one-flowered.

CO'MFIT. *s.* (from *confect.*) A dry sweetmeat; any kind of fruit or root preserved with sugar, and dried (*Hudibras*).

To CO'MFIT. *v. a.* To preserve dry with sugar (*Cowley*).

CO'MFITURE. *s.* Sweetmeat (*Donne*).

To CO'MFORT. *v. a.* (*comforto*, Latin.) 1. To strengthen; to enliven; to invigorate (*Bacon*). 2. To console; to strengthen the mind under calamity (*Job*).

CO'MFORT. *s.* (from the verb.) 1. Support; assistance; countenance (*Bacon*). 2. Consolation; support under calamity or danger (*Tillotson*). 3. That which gives consolation (*Shakspeare*).

CO'MFORTABLE. *a.* (from *comfort.*) 1. Receiving comfort; not in use (*Shakspeare*).

2. Admitting comfort (*South*). 3. Dispensing comfort (*Dryden*).

CO'MFORTABLY. *ad.* In a comfortable manner; with cheerfulness (*Hammond*).

CO'MFORTER. *s.* (from *comfort.*) 1. One that administers consolation in misfortunes (*Shakspeare*). 2. The title of the third person of the Holy Trinity.

CO'MFORTLESS. *a.* (from *comfort.*) Wanting comfort (*Swift*).

CO'MFREY. *s.* (*comfrie*, Fr.) A plant. See SYMPHITUM.

CO'MICAL. *a.* (*comicus*, Latin.) 1. Raising mirth; merry; diverting (*Dryden*). 2. Relating to comedy; befitting comedy.

CO'MICALLY. *ad.* 1. In such a manner as raises mirth. 2. In a manner befitting comedy.

CO'MICALNESS. *s.* The quality of being comical; the power of raising mirth.

CO'MICK. *a.* (*comicus*, Latin; *comique*, Fr.) 1. Relating to comedy (*Roscommon*). 2. Raising mirth (*Shakspeare*).

COMIERS (Claude), canon of Embrun, and professor of mathematics at Paris, died in 1693. He wrote two treatises on the Nature of Comets, another on Spectacles, and some other curious pieces.

COMINES (Philip de), a noble historian. He was born in Flanders, in 1446, and became eminent as a statesman at the court of Lewis XI. of France. On the death of that monarch he was sent to prison, and was treated with great severity. However, he was acquitted, and died in 1509. His Memoirs of his own Times shew a great knowledge of men and things in general, an acuteness of judgment in tracing circumstances to their hidden causes, and are enriched besides with a variety of excellent observations. He is very impartial, particularly with respect to the English, whom he always mentions in honourable terms.

CO'MING. *s.* (from *to come.*) 1. The act of coming; approach (*Milton*). 2. The state of being come; arrival (*Locke*).

CO'MING-IN. *s.* Revenue; income (*Shakspeare*).

CO'MING. *particip. a.* (from *come.*) 1. Fond; forward; ready to come (*Pope*). 2. Future; yet to come (*Roscommon*).

COMITIA, an assembly of the Roman people, either in the Comitium, or Campus Martius, i. e. Field of Mars; meeting for the election of magistrates, or for consulting on the important affairs of the republic. The word comes from the verb *coco*, or *comeo*, to go together. There were certain days fixed for these assemblies, called dies comitiales; marked with a C in the calendar of Julius Cæsar.

COMITIA CURIATA. Romulus instituted the comitia curiata, or the public assemblies of the people, called to vote in their several curiæ; and it is agreed by all, that the matters subjected to their decision, were the choice of all the magistrates, and the right of making laws, war, and peace: an ample jurisdiction, and the most important articles of government, yet not wholly absolute, according to Dionysius, unless the senate concurred with them. This method of transacting all the greater affairs by the people, assembled in their curiæ, after it had subsisted through five successive reigns, was found to be inconvenient; and, therefore, Servius Tullius, the sixth king of Rome, instituted a new division of the people into six classes, according to a census, or valuation of their estates: whence proceed the comitia centuriata: then he subdivided these classes in such a way as ultimately transferred the balance of power into the hands of the rich.

COMI'TIAL. *a.* (*comitia*, Latin.) Relating to the assemblies of the people of Rome.

COMITIUM, in Roman antiquity, a large hall in the forum where the comitia were generally held.

CO'MITY. *s.* (*comitas*, Latin.) Courtesy; civility.

COMMA, among grammarians, a point or character marked thus (,), serving to denote a short stop, and to divide the members of a period. Different authors define and use it differently. According to F. Bussier, the comma serves to distinguish the members of a period, in each of which is a verb and the nominative case of the verb: thus, "That so many people are pleased with trifles, is owing to a weakness of mind, which makes them love things easy to be comprehended." Besides this, the comma is used to distinguish, in the same member of a period, several nouns-substantive, or nouns-adjective, or verbs not united by a conjunction: thus, "Virtue, wit, knowledge, are the chief advantages of a man:" or, "A man never becomes learned without studying constantly, methodically, with a gust, application," &c.

COMMA, in music, the smallest sensible interval of tone. The greater comma, or the interval of two sounds, having the ratio of 81 to 80, is the difference of the major and minor tones. The smaller comma is the difference between the greater and lesser semitones; the proportion expressing it, is that of 2048 to 2025. The comma of Pythagoras is expressed by the ratio of 531441 to 524288; or, it is the difference between six tones major and an octave.

To COMMA'ND. *v. a.* (*commander*, Fr.) 1. To govern; to give orders to (*Decay of Piety*). 2. To order; to direct to be done (*Shakspeare*). 3. To have in power (*Gay*). 4. To overlook; to have so subject as that it may be seen or annoyed (*Milton*).

To COMMA'ND. *v. n.* To have the supreme authority (*South*).

COMMA'ND. *s.* (from the verb.) 1. The right of commanding; power; supreme authority (*Waller*). 2. Cogent authority; despotism (*Locke*). 3. The act of commanding; the mandate uttered; order given (*Taylor*). 4. The power of overlooking (*Dryden*).

COMMANDANT, in the army, is that person who has the command of a garrison, fort, castle, regiment, company, &c.

COMMA'NDER. *s.* (from *command.*) 1.

He that has the supreme authority; a general; a leader; a chief (*Clarendon*). 2. A paving beetle, or a very great wooden mallet (*Moxon*). 3. An instrument of surgery (*Wiseman*).

COMMANDER, in the navy, an officer who has the command of a ship of war under 20 guns, a sloop of war, armed ship, or bomb-vessel. He is entitled master and commander, and ranks with a major of the army.

COMMANDER IN CHIEF is the chief admiral in any port, or on any station, appointed to hold the command over all other admirals within that jurisdiction.

COMMA'NDERY. *s.* (from *command.*) A body of the knights of Malta, belonging to the same nation.

COMMANDINE (Frederick), a celebrated mathematician and linguist, was born at Urbino in Italy, in 1509; and died in 1575; consequently at 66 years of age. He was famous for his learning and knowledge in the sciences. To a great depth, and just taste in mathematics, he joined a critical skill in the Greek language; a happy conjunction which made him very well qualified for translating and expounding the writings of the Greek mathematicians. And accordingly, with a most laudable zeal and industry, he translated and published several of their works, to which no former writer had done that good office. On which account, Francis Moria, duke of Urbino, who was very conversant in those sciences, proved a very affectionate patron to him. He is greatly applauded by Bianchanus, and other writers; and he justly deserved their encomiums. Of his own works Commandine published the following: 1. Commentarius in Planisphærium Ptolomæi, 1558, in 4to. 2. De Centro Gravitatis Solidorum, Bonon. 1565, in 4to. 3. Horologiorum Descriptio, Rom. 1562, in 4to. He translated and illustrated with notes several works of Archimedes, Apollonius, Euclid, and Ptolemy.

COMMA'NDMENT. *s.* (*commandement*, Fr.) 1. Mandate; command; order; precept. 2. Authority; coactive power (*Shakspeare*). 3. By way of eminence, the precepts of the decalogue given by God to Moses (*Exodus*).

COMMA'NDRESS. *s.* A woman vested with supreme authority (*Hooker*).

COMMATE'RIAL. *a.* (from *con* and *materia*, Latin.) Consisting of the same matter with another (*Bacon*).

COMMATERIA'LITY. *s.* Participation of the same matter.

COMMELI'NA. In botany, a genus of the class triandria, order monogynia. Corol six-petalled; nectaries three, cross-shaped, pedicelled. Thirteen species: in some two of the petals are larger than the rest: in others, three of them are larger. This last subdivision has been named by some botanists zanonia. The petals are commonly blue; sometimes yellow; and not unfrequently the larger blue, while the smaller are green. Most of the species are Indian plants: the rest chiefly American.

COMME'MORABLE. *a.* (from *commemorate.*) Deserving to be mentioned with honour.

To COMME'MORATE. *v. a.* (*con* and *memoro*, Latin.) To preserve the memory by some publick act (*Fiddes*).

COMMEMORA'TION. *s.* (from *commemorate.*) An act of publick celebration (*Taylor*). The eucharist is a commemoration of the sufferings of Jesus Christ.

COMMEMORATION is also the name of two religious feasts, otherwise called All-Saints, and All-Souls. The occasion of their institution is variously related.

COMME'MORATIVE. *a.* (from *commemorate.*) Tending to preserve the memory of any thing (*Atterbury*).

To COMME'NCE. *v. n.* (*commencer*, Fr.) 1. To begin; to take beginning (*Rogers*). 2. To take a new character (*Pope*).

To COMME'NCE. *v. a.* To begin; to make a beginning of (*Shakspeare*).

COMME'NCEMENT. *s.* (from *commence.*) Beginning; date (*Woodward*).

COMMENCEMENT, in the university of Cambridge, is the day of granting degrees, &c. at the senate house, previous to the long vacation: it is always the first Tuesday in July.

To COMME'ND. *v. a.* (*commendo*, Latin.) 1. To represent as worthy of notice, regard, or kindness; to recommend (*Knolles*). 2. To deliver up with confidence (*Luke*). 3. To mention with approbation (*Cowley*). 4. To recommend to remembrance (*Shakspeare*). 5. To produce to favourable notice (*Dryden*).

COMME'ND. *s.* Commendation (*Shakspeare*).

COMME'NDABLE. *a.* (from *commend.*) Laudable; worthy of praise (*Bacon*).

COMME'NDABLY. *ad.* (from *commendable.*) Laudably; in a manner worthy of commendation (*Carew*).

COMMENDAM, in the ecclesiastical law, the trust or administration of the revenues of a benefice, given either to a layman, to hold by way of depositum for six months, in order to repairs, &c. or to an ecclesiastical or beneficed person, to perform the pastoral duties thereof, till the benefice can be provided with a regular incumbent. Formerly the administration of vacant bishoprics belonged to the nearest neighbouring bishop; which custom appears to be very ancient. St. Athanasius says of himself, according to Nicephorus, that there had been given him in commendam, i. e. in administration, another church besides that of Alexandria whereof he was stated bishop. When a parson is made bishop, his parsonage becomes vacant; but if the king give him power, he may still hold it in commendam.

COMME'NDATARY. *s.* (from *commendam.*) One who holds a living in commendam.

COMMENDA'TION. *s.* (from *commend.*) 1. Recommendation; favourable representation (*Bacon*). 2. Praise; declaration of esteem (*Dryden*). 3. Message of love (*Shakspeare*).

COMME'NDATORY. *a.* (from *commend.*) Favourably representative; containing praise.

COMMENDATUS, one who lives under the protection of a great man. Commendati homines, were those who voluntarily put themselves under such protection. Those who depended on two lords, and paid equal homage to each, were called commendati dimidii. Subcommendati, were under the protection of commendati.

COMME'NDER. *s.* (from *commend.*) Praiser.

COMMENSA'LITY. *s.* (from *commensalis*, Latin.) Fellowship of table; the custom of eating together (*Brown*).

COMMENSURABI'LITY. *s.* (from *commensurable.*) Capacity of being compared with another, as to the measure; or of being measured by another (*Brown*).

COMMENSURABLE, among geometricians, an appellation given to such quantities as are measured by one and the same common measure.

COMMENSURABLE NUMBERS, whether integers, surds, or fractions, are such as can be measured or divided by some other number without any remainder: such are 12 and 18, as being measured by 6 and 3: also $2\sqrt{2}$ and $3\sqrt{2}$, being measured by $\sqrt{2}$.

COMMENSURABLE IN POWER, is said of right lines, when their squares are measured by one and the same space or superficies.

COMMENSURABLE SURDS, those that being reduced to their least terms, become true figurative quantities of their kind; and are therefore as a rational quantity to a rational one.

COMME'NSURABLENESS. *s.* Commensurability; proportion (*Hale*).

To COMME'NSURATE. *v. a.* (*con* and *mensura*, Latin.) To reduce to some common measure (*Brown*).

COMME'NSURATE. *a.* (from the verb.) 1. Reducible to some common measure. 2. Equal; proportionable to each other (*Tillot.*).

COMME'NSURATELY. *ad.* With the capacity of measuring, or being measured by some other thing (*Holder*).

COMMENSURA'TION. *s.* (from *commensurate.*) Reduction of some things to some common measure; proportion (*South*).

To CO'MMENT. *v. n.* (*commentor*, Latin.) 1. To annotate; to write notes upon an author; to expound; to explain (*Herbert*). 2. To make remarks (*Shakspeare*).

CO'MMENT. *s.* Annotations on an author; notes; exposition; remarks (*Hammond*).

COMMENTACULA, in antiquity, the rod of the flamens.

CO'MMENTARY. *s.* (*commentarius*, Lat.) 1. An exposition; book of annotations or remarks (*K. Charles*). 2. Narrative in familiar manner (*Addison*).

COMMENTA'TOR. *s.* (from *comment.*) Expositor; annotator (*Dryden*).

COMME'NTER. *s.* (from *comment.*) An explainer; an annotator (*Donne*).

COMMENTI'TIOUS. *a.* (*commentitius*, Lat.) Invented; factitious; imaginary (*Glan.*).

COMMERCE, the exchange of commodities; or, the buying, selling, or trafficking of merchandize, money, or even paper, in order to profit by the same. Or commerce has been defined an operation by which the wealth, or work, either of individuals or of societies, may be exchanged by a set of men called merchants, for an equivalent, proper for supplying every want, without any interruption to industry, or any check upon consumption. There is no doubt but commerce is nearly as ancient as the world itself: necessity set it on foot; the desire of convenience improved it; and vanity, luxury, and avarice have brought it to its present pitch. At first it could only consist in the exchange of things necessary for life; the ploughman gave his corn and his pulse to the shepherd, and received milk and wool in exchange. Indeed, this method of commerce by exchange subsists still in many places; as about the coasts of Siberia, and the Danish and Muscovite Lapland; among several nations on the coasts of Africa; among some of those of America, and many of Asia.

It is not precisely known when commerce by buying and selling first began; nor when the several coins of gold, silver, and copper, had their origin. The first money consisted of wood, leather, or iron; and even at this day, it is the custom in some parts of both Indies to give a certain value in sea-shells and cocoa-nuts, for merchandise, drugs, &c.

Commerce, on the foot it now stands, is divided into commerce by land, and by sea; inland or domestic, and foreign; and by whole-sale and retail. With respect to domestic commerce, we may observe, that the king is the arbiter of it; as it pertains to his prerogative to establish public marts, as markets and fairs, to regulate weights and measures, and to give money, which is the universal medium of commerce, authority and currency. A great part of the foreign commerce of England is now carried on by collective companies: some incorporated by the king's charters, with an exclusive privilege, as the East India company; others only private associations, as the Turkey and Hamburgh companies.

On this very important topic, the due discussion of which would fill a volume, we must refer to Dubost on Commerce, and Mr. Erasmus Phillips's State of the Nation in Respect to her Commerce: in the present article we must satisfy ourselves with stating a few results.

From the peace of 1783, our manufacturers have almost universally acted as merchants, and shipped their goods on their own account. They have gained possession of the foreign markets in part from the superiority of their skill, but far more from the superiority of their capital, which has enabled them to give a credit considerably greater than the exporters of other countries can allow. The rapid increase of our commerce since that time will appear by the following account.

Years.	Imports.	Exports.
1784	£15,272,877	£15,734,062
1785	16,279,399	15,117,649
1786	15,786,072	16,300,730
1787	17,804,014	16,870,114
1788	18,027,188	17,472,408
1789	17,821,102	19,340,548
1790	19,130,886	20,120,121
1791	19,669,782	22,731,995
1792	19,659,358	24,905,200
1793	19,256,717	20,390,180
1794	22,288,894	26,748,967
1795	22,736,889	27,312,338
1796	23,187,319	30,424,184
1797	21,013,956	28,917,010
1798	27,857,889	33,591,777
1799	26,837,431	35,991,329
1800	30,570,605	43,152,019
1801	32,795,557	42,301,701
1802	31,442,318	46,120,962
1803	27,992,464	33,792,386
1804	- -	37,471,388

These accounts, formed from rates of value established above a hundred years ago, must of course give a very inadequate idea of the actual total value of the commerce of this country; the accounts are, however, from the very circumstance of being uniformly made up at the same rates, the more correct in a comparative view, and shew a progressive increase, which has arrived to an amount never before known in the commerce of any nation. During the last twenty years, it appears that the amount of the imports has more than doubled, and the amount of the exports has increased in a still greater proportion. The declared value of British produce and manufactures exported during the year ending 5th January, 1804, was 40,100,642*l.*; the amount of foreign merchandize exported in the latter year was (after correcting the value of coffee, which is rated too high) 10,515,574*l.*; the actual total value of the exports of Great Britain, in the year ending 5th January, 1805, was therefore at least 50,865,216*l.*

Of the total exports of Great Britain, about two-thirds of the corrected official value consists of British produce and manufactures, and one third of foreign merchandize; of the former little more than one-fourth is exported to the continent of Europe, about the same amount to the United States of America, and the remainder to the East and West Indies, and all other parts.

Total official value of the imports and exports of Great Britain, in the year 1805.

	Imports.	Exports.
Denmark and Norway	£1,071,579	£5,172,066
Russia	2,527,078	1,646,475
Sweden	269,161	159,597
Poland	429,450	80,500
Prussia	1,790,781	5,520,072
Germany	319,444	2,180,784
Holland	726,264	418,801
Carried forward	7,133,757	15,178,295
Brought forward	7,133,757	15,178,295
Flanders	3,070	23,343
France	469,820	551
Portugal and Madeira	936,500	1,495,814
Spain and Canaries	916,165	111,380
Streights and Gibraltar	42,919	183,823
Italy	393,517	507,535
Malta	9,304	127,514
Turkey	103,590	135,410
Ireland	3,010,609	3,758,973
Isle of Man	21,697	62,431
Guernsey, Jersey, &c.	81,241	198,324
Greenland	261,086	952
Total of Europe	13,383,275	21,784,345
America and West Indies	9,615,161	12,163,917
Asia	6,072,160	1,638,600
New Holland	153	30,643
Africa	105,976	980,789
Sierra Leone	867	10,660
Total	£29,177,592	£36,608,954

Total official value of all the imports and exports of Great Britain for three years, ending the 5th of January, 1808.

	Imports.	Exports.
Year ending 5th January, 1806	£30,344,628	£34,954,845
1807	28,835,907	36,527,184
1808	29,153,101	34,586,045

The amount of imports from India and China for the last year is taken at the amount of the preceding year, that part of the official account not being yet complete.

The value of British produce and manufactures exported in the year ending the 5th of January, 1808, was according to the official values at which the above account is formed, 25,190,762*l.*; but the real value, computed at the average market prices of the various articles, was 40,479,865*l.*

Total number of vessels, the amount of their tonnage, and the number of men and boys usually employed in navigating the same, which belonged to the several ports of the British empire, in the year 1807.

	Ships.	Tons.	Men.
England	15,132	1,796,552	119,631
Jersey	77	6,891	552
Guernsey	106	9,927	993
Isle of Man	390	9,373	2,259
Plantations	2,917	184,794	13,565
Scotland	2,615	216,553	15,658
Ireland	1,098	56,901	5,217
	22,335	2,280,991	157,875

Total number of vessels which entered inwards and cleared outwards in the ports of Great Britain for three years, ending with 1807.

Inwards.

	Ships.	Tons.	Men.
Year 1805	15,931	2,186,173	121,899
1806	15,911	2,095,568	120,342
1807	15,300	2,116,811	117,485

Outwards.

	Ships.	Tons.	Men.
Year 1805	15,540	2,101,030	125,332
1806	15,710	2,054,472	124,189
1807	15,274	2,055,613	121,131

The East India trade is a concern of vast magnitude, if considered merely in a commercial point of view. The annual sales of the imports of the company for 16 years preceding 1757, amounted to about 2,055,000*l.* on the average; during the succeeding 10 years, their sales of imports increased to 2,150,000*l.* per annum; in the following 10 years they rose to 3,330,000*l.* per annum. During the American war, the sales of imports fell off about 200,000*l.* per annum; but from that period to 1792, they increased again, and amounted on an average to 4,768,242*l.* The accounts of the following years shew a still greater increase.

Amount of the East India company's sales in the years ending 1st March, 1801, 1802, 1803, and 1804.

	India.	China.	Total.
1801	£3,978,800	£3,616,381	£7,595,181
1802	3,086,943	3,539,404	6,626,347
1803	2,289,274	3,753,252	6,042,526
1804	2,236,396	3,629,677	5,866,073

See farther, the article Company.

Commerce, is also a game at cards: and of this there are two distinct methods of playing, denominated the new and the old mode. The new is played by any number of persons from three to twelve, with a complete pack of fifty-two cards, bearing the same import as at whist, only that the ace is reckoned as eleven. Every player has a certain quantity of counters on which a fixed value is put, and each at every fresh deal lays down one for the stake. Sometimes the game is continued and only finished when one of the players has lost all the counters given at the commencement; but in order to prevent it from being spun out to an inconvenient length, or concluded too soon, it is customary to fix the duration to a determinate number of hours or times, so that the whole party shall deal once each completely round.

After determining the dealer, the dealer, or banker as he is here called, shuffles the pack, which is to be cut by the left-hand player: then three cards, either all together or one by one, at the dealer's option, are given to each person, beginning on the right hand, but none are to be turned up. If the pack prove false or the deal wrong, or if there be a faced card, there must be a fresh deal.

In this game there are three parts: 1st, that which takes the place of all others called the tricon or three cards of the same denomination, not unfrequently similar to the pair-royal at cribbage, and hence occasionally but improperly contracted into p'r-royal, or pryal; 2d, the sequence or three successive cards of the same suit, like tierce at piquet; and, lastly, the point, being the greatest number of pips on two or three cards of a suit in any one hand; of all which cards the higher annuls the lower.

After the cards have been dealt round, the banker inquires, *Who will trade?* which the players, beginning with the eldest hands, usually and separately answer by saying, *For ready money*, or *I barter*. Trading for money is giving a card and a counter to the banker, who places the card under the stock or remainder of the pack, styled the bank, and returns in lieu thereof another card from the top. The counter is profit to the banker, who consequently trades with the stock free from expence. Barter is exchanging a card without pay with the next right-hand player, which must not be refused, and so on, the party trade alternately, till one of them obtains the object aimed at, and thereby stops the commerce; then all shew their hands, and the highest tricon, sequence, or point wins the pool. The player who first gains the wished for tricon, &c. should shew the same immediately, without waiting till the others begin a fresh round, and if any one chooses to stand on hand dealt, and shews it without trading, none of the junior players can trade that deal, and if the eldest hand stands, then of course no person can trade. The banker always ranks as eldest hand, in case of neither tricon or sequence, when the game is decided by the point. Whenever the banker does not gain the pool, then he is to pay a counter to that player, who obtains the same, and if the banker possesses tricon, sequence, or point, and do not win the pool, because another player has a better hand, in respect to the point, then he is to give a counter to every player.

Commerce in the old way is played by several persons together, every one depositing a certain sum in the pool and receiving three fishes or counters a piece, on which a value is fixed; as suppose sixpences are pooled, the counters then may be rated at 1*d.* or 1½*d.* each, so as to leave a sum for that player who gains the final sweep. After determining the deal, three cards, by one at a time, beginning on the left hand, are given to every player, and as many turned up on the board. This game is gained, as at the other, by pairs-royal, sequences, or flushes, and should the three cards turned up be such as the dealer approves of, he may, previous to looking at the hand dealt to himself, take them so turned up in lieu of his own, but then must abide by the same, and cannot afterwards exchange any during that deal. All the players, beginning with the eldest hand, may in rotation change any card or cards in their possession for such as lie turned up on the table, striving thereby to make pairs-royal, sequences, or flushes, and so on round again and again, till all have refused to change, or are satisfied, but every person once standing cannot change again that deal. Finally, the hands are all shewn, and the possessor of the highest pair-royal, &c. or the eldest hand, if there are more than one of the same value, takes the sum agreed upon out of the pool, and the person having the worst hand puts one fish or counter therein, called going up. The player, whose three are first gone off, has the liberty of purchasing one more, called buying a horse, for a

sum as agreed, usually one-third of the original stake, to be put into the pool. After that, every player, whose fish are all gone, sits by till the game is concluded, which finishes by the person who continues the longest on the board, thereby gaining the pool or final sweep.

To COMME'RCE. *v. n.* 1. To traffick (*Ral.*). 2. To hold intercourse with (*Milton*).

COMME'RCIAL. *a.* (from *commerce.*) Relating to commerce or traffick.

COMMERSONIA. In botany, a genus of the class pentandria, order pentagynia. Calyx one-leafed bearing the corol; petals five; nectary five parted; capsule five-celled, beset with long hairy bristles. One species only; an Otaheitan tree, with panicled, minute, heavy flowers.

To CO'MMIGRATE. *v. n.* (*con* and *migro*, Latin.) To remove in a body, or by consent, from one country to another.

COMMIGRA'TION. *s.* (from *commigrate.*) A removal of a body of people from one country to another (*Woodward*).

COMMINA'TION. *s.* (*comminatio*, Lat.) 1. A threat; a denunciation of punishment, or of vengeance (*Decay of Piety*). 2. The recital of God's threatenings on stated days (*Common Prayer*).

COMMI'NATORY. *a.* (from *commination.*) Denunciatory; threatening.

To COMMI'NGLE. *v. a.* (*commisceo*, Lat.) To mix into one mass; to mix; to blend (*Shakspeare*).

To COMMI'NGLE. *v. n.* To unite one with another (*Bacon*).

COMMINU'IBLE. *a.* (from *comminute.*) Fragible; reducible to powder (*Brown*).

To COMMINU'TE. *v. a.* (*comminuo*, Lat.) To grind; to pulverize (*Bacon*).

COMMINU'TION. *s.* (from *comminute.*) 1. The act of grinding into small parts; pulverization (*Bentley*). 2. Attenuation.

COMMI'SERABLE. *a.* (from *commiserate.*) Worthy of compassion; pitiable (*Bacon*).

To COMMI'SERATE. *v. a.* (*con* and *misereor*, Lat.) To pity; to compassionate (*Locke*).

COMMISERA'TION. *s.* (from *commiserate.*) Pity; compassion; tenderness (*Hooker*).

Although commiseration seems synonymous with mercy, yet in its general use it is somewhat different. It is always preferred when we wish to express our sympathy for misfortunes, which it is not in our power to remove; or, for which there is no apparent remedy. Commiseration ruminates upon the state and sufferings of others, which induces a permanent concern. In such cases it may be said that we commiserate the unfortunate sufferer, rather than that we have compassion with him. But although this is a more helpless, it is not a useless, affection. It soothes the mind of the afflicted, and greatly alleviates their sorrows, when every other consolation fails. Condolence is the expression of our commiseration. (*Cogan*, p. 134.)

CO'MMISSARISHIP. *s.* (from *commissary.*) The office of a commissary (*Ayliffe*).

CO'MMISSARY. *s.* (*commissarius*, low Latin.) 1. An officer made occasionally for a certain purpose; a delegate; a deputy. 2. An officer who draws up lists of an army, and regulates the procuration of provision (*Prior*).

COMMISSARY GENERAL OF THE MUSTERS, an officer appointed to muster the army when the general thinks proper, in order to know the strength of each regiment and company, to receive and inspect the muster-rolls, and to keep an exact state of the strength of the army.

COMMISSARY GENERAL OF THE STORES, an officer in the artillery, who has the charge of all the stores, for which he is accountable to the office of ordnance.

COMMISSARY GENERAL OF PROVISIONS, an officer who has the inspection of the bread and provisions of the army.

COMMI'SSION. *s.* (*commissio*, low Lat.) 1. The act of entrusting any thing. 2. A trust; a warrant by which any trust is held, or authority exercised (*Shakspeare*). 3. A warrant by which a military officer is constituted (*Knolles*). 4. Charge; mandate; office (*Milt.*). 5. Act of committing a crime: perpetration (*Smith*). 6. A number of people joined in a trust or office. 7. The state of that which is entrusted to a number of joint officers: as, *the great seal was put into* commission. 8. The order by which a factor trades for another person.

COMMISSION OF BANKRUPTCY, is that issued by the lord chancellor, on persons becoming bankrupt within any of the statutes, and directed to certain commissioners, who are appointed to examine into it, and to secure the bankrupt's lands and effects, for the satisfaction of his creditors. See BANKRUPT.

The proceedings on a commission of bankruptcy relate, 1. either to the bankrupt himself; or, 2. to his property.

1. In the former case, a petition should be presented to the lord chancellor, by a creditor to the amount of 100l.; or by two, to the value of 150l.; or by three, or more, to that of 200l.; in consequence of which, he grants a commission to certain persons denominated commissioners of bankrupt. The petitioners are bound in a security of 200l. to make the party amends, in case they do not prove him bankrupt. And if they receive any of the bankrupt's money, or effects, as a recompense for suing out the commission, so as to obtain more than their due proportion of his estate, they forfeit the same, together with their whole debt.

On receiving their commission, the commissioners first ascertain whether the bankrupt was a trader, within the meaning of the bankrupt laws, and had committed an act of bankruptcy; and if it be so proved, declare him bankrupt, give notice in the Gazette, and appoint three meetings for the creditors. At one of these meetings are chosen by a majority (in value) of creditors, the assignees, or persons in whom the bankrupt's estate shall be vested for their benefit. And, at the third meeting, which must be on the 42d day, at farthest, after the advertisement in the Gazette (unless the

time for his surrender be especially enlarged), the bankrupt, on notice being served personally on him, or left at his place of abode, must surrender himself to the commissioners, and thenceforth conform in every respect to the directions of the statutes of bankruptcy; or, in default thereof, he is guilty of felony, without benefit of clergy, suffers death, and his effects are divided among his creditors.

When the bankrupt appears, the commissioners are to examine him concerning his trade and effects; and if he give a false statement, or conceal any property to the value of 20l. or withhold any books or writings, in order to defraud his creditors, he is also guilty of felony, without benefit of clergy. But if the bankrupt has made a true discovery, conformed to the directions of the statutes, and acted to the satisfaction of his creditors, and they (or four-fifths of them in number and value) will sign a certificate to that purport, the commissioners are to authenticate the same under their hands and seals, and transmit it to the chancellor, who, or two judges appointed by him, on oath made by the bankrupt, that such certificate was not fraudulently obtained, may allow the same, or disallow it, upon cause shewn by any of the creditors. If no cause be shewn, the certificate is granted, and the bankrupt is entitled to an allowance out of his effects, in proportion to the dividend paid. In consequence of such certificate, he is discharged from every debt owing by him at the time he became a bankrupt.

2. With respect to the proceedings affecting the bankrupt's property, the assignees may pursue any legal remedy for getting possession of the same, but cannot commence a suit in equity, compound debts owing to the bankrupt, nor refer matters to arbitration, without the consent of the major part, in value, of the creditors. As soon as they have collected all the effects, and converted them into money, they must, within 12 months after the issuing of the commission, give 21 days notice to the creditors, of a meeting for a dividend, or distribution, at which time they are to produce their accounts, and verify on oath, if required. A dividend of so much in the pound is then to be made equally and rateably to all who have already ascertained, or may then prove, their debts. Within 18 months after the commission issued, a second and final dividend is to be made, unless all the effects were exhausted by the first. And if any surplus remain after satisfying all the debtors, it shall be restored to the bankrupt. For more on this subject, see Mr. Cooke's Bankrupt Laws, and Mr. Cullen's Principles of Bankrupt Law.

To Commi'ssion, *v. a.* 1. To empower; to appoint. 2. To send with mandate or authority (*Dryden*).

To COMMI'SSIONATE. *v. a.* To commission; to empower: not in use (*Decay of Piety*).

COMMISSIONER, he who has a commission, *e. gr.* a patent, or other legal warrant, to execute any public office. Such are, commissioners of hawkers and pedlars, commissioners of the stamps, &c.

COMMISSURA ANTERIOR CEREBRI. In anatomy, the white, nerve-like substance which crosses the anterior part of the third ventricle of the brain, immediately above the infundibulum, and between the anterior crura of the fornix; uniting one hemisphere of the brain with the other.

Commissura magna cerebri. The corpus callosum of the brain is so termed by some writers.

Commissura posterior cerebri. A white, nerve-like substance, which passes from one hemisphere of the brain across to the other, immediately over the opening of the aqueduct of Sylvius, in the posterior part of the third ventricle of the brain, and above the corpora quadrigemina.

COMMISSURE. (*commissura*, from *committo*, to join together). A suture, juncture, or joint. A term applied in anatomy to the corners of the lips, where they meet together; and also to certain parts of the brain which go across from one hemisphere to the other.

Commissure, in architecture, the application of the surface of one stone to that of another, as a joint.

To COMMI'T. *v. a.* (*committo*, Latin.) 1. To intrust; to give in trust (*Shakspeare*). 2. To put in any place to be kept safe (*Dryden*). 3. To send to prison; to imprison (*Clarendon*). 4. To perpetrate; to do a fault (*Clarendon*).

COMMI'TMENT. *s.* (from *commit.*) 1. Act of sending to prison (*Clarendon*). 2. An order for sending to prison.

Commi'tment, is the sending of a person to prison by warrant or order, either for a crime or for contumacy. If for a crime the warrant must be until discharged according to law; but for contumacy, until he comply, and perform the thing required. Carth. 153. The commitment should be in writing; otherwise, by the habeas-corpus act, the prisoner may be admitted to bail whatever his offence may have been. 1. Burn. 379.

Who may commit.—Wherever a constable or person may justify the arresting another for a felony, or treason, he may justify the sending him or bringing him to the common gaol. 2 Haw. 116. But it is most advisable, for any private person who arrests another for felony, to cause him to be brought as soon as possible before some justice of the peace, that he may be committed or bailed by him. Dall, c. 118.

The privy-council, or any one or two of them, or a secretary of state, may lawfully commit persons for treason, and for other offences against the state. 2 Haw. 117.

To what place.—All felons shall be committed to the common gaol and not elsewhere. 5 Hen. IV. c. 10. But vagrants and other criminals, offenders and persons charged with small offences, may for such offences, or for want of sureties, be committed either to the common gaol or house of correction, as the

justices in their judgment shall think proper. 6 G. c. 19.

Who may be committed.—All persons who are apprehended for offences not bailable, and those who neglect to offer bail for offences which are bailable, must be committed; and wherever a justice of peace is empowered to bind a person over, or to cause him to do a certain thing, he may commit him, if in his presence he shall refuse to be so bound or do such a thing. 2 Haw. 116.

A commitment must be in writing, either in the name of the king, and only attested by the person who makes it; or it may be made by such person in his own name, expressing his office or authority, and must be directed to the gaoler or keeper of the prison. 2 Haw. 119. The commitment should contain the name and surname of the party committed, if known; if not known, it may be sufficient to describe the person by his age, &c. and to add, that he refuses to tell his name. 1 H. H. 557. It ought to contain the causes, as for treason or felony; and also the special nature of the felony, briefly, as for felony for the death of such a one, or for burglary, in breaking the house of such a one. 2 H. H. 122.

Commitment discharged.—A person legally committed for a crime, certainly appearing to have been done by some person or other, cannot be lawfully discharged but by the king, till he is acquitted upon his trial, or has an ignoramus found by the grand jury, or none shall prosecute him, on a proclamation for that purpose by the justices of gaol-delivery. 2 Haw. 121.

COMMI'TTEE. *s.* (from *commit.*) Those to whom the consideration or ordering of any matter is referred (*Cowell*).

COMMITTEE OF PARLIAMENT, a certain number of members appointed by the house, for the examination of a bill, making report of an inquiry, process of the house, &c.

When a parliament is called, and the speaker and members have taken the oaths, there are committees appointed to sit on certain days, viz. the committee of privileges and elections, of religion, of trade, &c. which are standing committees.

Sometimes the whole house resolves itself into a committee, on which occasion each person has a right to speak and reply as often as he pleases, which is not the case when the house is not in a committee.

COMMI'TTER. *s.* (from *commit.*) Perpetrator; he that commits (*South*).

COMMI'TTIBLE. *a.* (from *commit.*) Liable to be committed (*Brown*).

To COMMI'X. *v. a.* (*commisceo*, Lat.) To mingle; to blend (*Newton*).

COMMI'XION, COMMI'XTION. *s.* (from *commix.*) Mixture; incorporation of different ingredients (*Shakspeare. Brown*).

COMMI'XTURE. *s.* (from *commix.*) 1. The act of mingling; the state of being mingled; incorporation (*Bacon*). 2. The mass formed by mingling different things; composition; compound (*Wotton*).

COMMO'DE. *s.* (French.) The headdress of women (*Glanville*).

COMMO'DIOUS. *a.* (*commodus*, Latin.) 1. Convenient; suitable; fit; proper (*Pope*). 2. Useful; suited to wants or necessities (*Hooker*).

COMMO'DIOUSLY. *ad.* 1. Conveniently (*Cowley*). 2. Without uneasiness (*Milton*). 3. Suitably to a certain purpose (*Hooker*).

COMMO'DIOUSNESS. *s.* (from *commodious.*) Convenience; advantage (*Temple*).

COMMODUS (L. Aurelius Antoninus), son of M. Antoninus, succeeded his father in the Roman empire. He was naturally cruel, and fond of indulging his licentious propensities, and regardless of the instructions of philosophers, and of the decencies of nature, he corrupted his own sisters, and kept 300 women, and as many boys, for his illicit pleasure. He showed himself naked in public, and fought with the gladiators, and boasted of his dexterity in killing wild beasts in the amphitheatre. He required divine honours from the senate, and they were granted. Martia, one of his concubines, whose death he had prepared, poisoned him; but as the poison did not quickly operate, he was strangled by a wrestler. He died in the 31st year of his age, and the 13th of his reign, A.D. 192. He never trusted himself to a barber, but always burnt his beard, in imitation of the tyrant Dionysius.

COMMO'DITY. *s.* (*commoditas*, Latin.) 1. Interest; advantage; profit (*Hooker*). 2. Convenience; particular advantage (*Sidney*). 3. Wares; merchandise (*Locke*).

COMMODO'RE. *s.* (corrupted from the Spanish *commandador.*) The captain who commands a squadron of ships.

CO'MMON. *a.* (*communis*, Latin.) 1. Belonging equally to more than one (*Hale*). 2. Having no possessor or owner (*Locke*). 3. Vulgar; mean; easy to be had (*Davies*). 4. Publick; serving the use of all (*Addison*). 5. Of no rank; mean (*Shakspeare*) 6. Frequent; usual; ordinary (*Clarendon*). 7. Prostitute (*Spectator*). 8. Such verbs as signify both action and passion are called *common*; as, *aspernor, I despise*, or *am despised*; and also such nouns as are both masculine and feminine; as, *parens*.

COMMON BUD. In botany, communis gemma. Containing both leaves and flowers. Common peduncle, communis pedunculus. Bearing several flowers.—Common perianth; inclosing several distinct fructifications as in the class syngenesia.

COMMON RECEPTACLE. In botany, connecting several distinct fructifications; as in the same class.

COMMON, is applied to an angle, line, measure, or the like, that belongs to two or more figures, or other things. As, a common angle, a common side, a common base, a common measure, &c.

COMMON MEASURE, or DIVISOR, is that which measures two or more things without a remainder. So of 8 and 12, a common measure is 2, and so is 4.

The greatest common measure, is the greatest number that can measure two other numbers. So, of 8 and 12, the greatest common measure is 4.

To find the greatest common measure of two numbers.—Divide the greater term by the less; then divide the divisor by the remainder, if there be any, and so on continually, always dividing the last divisor by the last remainder, till nothing remains; and then is the last divisor the greatest common measure sought. For a demonstration, see Manning's Algebra, vol. i. p. 80.

COMMON LAW. The common law of England, is the common rule for administering justice within the kingdom, and asserts the king's royal prerogatives and likewise the rights and liberties of the subject. It is generally that law by which the determinations in the king's ordinary courts are guided. It is distinguished from the statute laws or acts of parliament, as having been the law of the land before any acts of parliament which are now extant were made. Hale's Hist. 24. 44. 45.

COMMON-PLACE BOOK, is a register of what things occur, worthy to be noted, in the course of a man's thinking or study, so disposed as that among a number of subjects any one may be easily found. The advantages of keeping a common-place book are many: it not only makes a man read with accuracy and attention, but induces him insensibly to think for himself, provided he considers it not so much as a register of sentiments that strike him in the course of reading, but as a register of his own thoughts upon various subjects. Many valuable thoughts occur even to men of no extraordinary genius. These, without the assistance of a common-place book, are generally lost both to himself and others. There are various methods of arranging common-place books; that of Mr. Locke is the best of any that have hitherto been contrived.

The first page of the book you intend to take down the different articles in, is to serve as a kind of index to the whole, and to contain references to every place or matter therein: in the commodious contrivance of which index, so as it may admit of a sufficient copia or variety of materials, without any confusion, all the secret of the methods consists. In order to this, the first page, as already mentioned, or, for more room, the two first pages that front each other, are to be divided by parallel lines, into 25 equal parts; whereof every fifth line is to be distinguished by its colour. These lines are to be cut perpendicularly by others, drawn from top to bottom; and in the several spaces thereof, the several letters of the alphabet, both capital and minuscle, are to be duly written. The form of the lines and divisions, both horizontal and perpendicular, with the manner of writing the letters therein, will be conceived from the following specimen; wherein, what is to be done in the book for all the letters of the alphabet, is here shewn in the first four, *A*, *B*, *C*, and *D*.

	a		*a*
	e		*e*
A	*i*	*C*	*i*
	o		*o*
	u		*u*
	a		*a*
	e 2, 3.		*e*
B	*i*	*D*	*i*
	o		*o*
	u		*u*

The index of the common-place book thus formed, matters are ready for the taking down any thing therein; and in order to this, consider to what head the thing you would enter is most naturally referred; and under which one would be led to look for such a thing: in this head, or word, regard is to be had to the initial letter, and the first vowel that follows it; which are the characteristic letters whereon all the use of the index depends. Suppose, *e.g.* I would enter down a passage that refers to the head *beauty*. *B*, I consider, is the initial letter, and *e* the first vowel: then looking upon the index for the partition *B*, and therein the line *e* (which is the place for all words whose first letter is *b*, and first vowel *e*; as *beauty*, *beneficence*, *bread*, *breeding*, *blemishes*), and finding no numbers already down to direct me to any page of the book where words of this characteristic have been entered, I turn forward to the first blank page I find (which, in a fresh book, as this is supposed to be, will be page 2.), and here write what I have occasion for on the head *beauty*; beginning the head in the margin, and indenting all the other subservient lines, that the head may stand out and show itself: this done, I enter the page where it is wrote, viz. 2, in the index in the space *B e*; from which time, the class becomes wholly in possession of the 2d and 3d pages which are consigned to letters of this characteristic.

Note. If the head be a monosyllable beginning with a vowel, the vowel is at the same time both the initial letter and the characteristic vowel; thus the word *Art* is to be written in A *a*. Mr. Locke omits three letters of the alphabet in his index, viz. K, Y, and W, which are supplied by C, I, and U, equivalent to

them: and as for Q, since it is always followed by an *u*, he puts it in the first place of Z; and so has no Z*u*, which is a characteristic that very rarely occurs. By thus making Q the last of the index its regularity is preserved without diminishing its extent. Others choose to retain the class Z*u*, and assign a place for Q*u* below the index.

If any imagine these hundred classes are not sufficient to comprehend all kinds of subjects without confusion, he may follow the same method and yet augment the number to 500, by taking in one more characteristic to them.

But the inventor assures us that in all his collections, for a long series of years, he never found any deficiency in the index as above laid down.

COMMON PLEAS is one of the king's courts now held constantly in Westminster hall, but in former times was moveable. All civil causes, as well real as personal, are, or were formerly, tried in this court, according to the strict law of the land. In personal and mixed actions it has a concurrent jurisdiction with the King's Bench, but has no cognizance of pleas of the crown. The actions belonging to the Court of Common Pleas come thither by original, as arrests and outlawries; or by privilege or attachment for or against privileged persons; or out of inferior courts, not of record, by pone, recordari, accedas ad curiam, writ of false judgment, &c. The chief judge of this court is called Lord Chief Justice of the Common Pleas, who is assisted by three other judges: the other officers of the court are the custos brevium, who is the chief clerk; three prothonotaries and their secondaries; the clerk of the warrants, clerk of the essoins, fourteen filazers, four exigentors, a clerk of the juries, the chirographer, the clerk of the king's silver, clerk of the treasury, clerk of the seal, clerk of the outlawries, clerk of the inrolment of fines and recoveries, and clerk of the errors.

COMMON PRAYER is the liturgy in the church of England. Clergymen are to use the public form of prayers prescribed by the Book of Common Prayer; and refusing to do so, or using any other public prayers, are punishable by 1 Eliz. c. ii.

CO'MMON. *s.* (from the adj.) An open ground equally used by many persons (*South*).

CO'MMON. *ad.* Commonly; ordinarily (*Shakspeare*).

In CO'MMON. 1. Equally to be participated by a certain number (*Locke*). 2. Equally with another; indiscriminately.

To CO'MMON. *v. n.* (from the noun.) To have a joint right with others in some common ground.

CO'MMONABLE. *a.* (from *common.*) What is held common (*Bacon*).

CO'MMONAGE. *s.* (from *common.*) The right of feeding on a common; the joint right of using any thing in common with others.

CO'MMONALTY. *s.* (*communauté*, Fr.) 1. The common people (*Milton*). 2. The bulk of mankind (*Hooker*).

CO'MMONER. *s.* (from *common.*) 1. One of the common people; a man of low rank (*Addison*). 2. A man not noble (*Prior*). 3. A member of the house of commons (*Swift*). 4. One who has a joint right in common ground (*Bacon*). 5. A student of the second rank at the university of Oxford. 6. A prostitute (*Shakspeare*).

COMMONI'TION. *s.* (*commonitio*, Lat.) Advice; warning; instruction.

CO'MMONLY. *ad.* (from *common.*) Frequently; usually; ordinarily (*Temple*).

CO'MMONNESS. *s.* (from *common.*) 1. Equal participation among many (*G. of T.*). 2. Frequent occurrence; frequency (*Swift*).

CO'MMONS. *s.* 1. The vulgar; the lower people (*Dryden*). 2. The lower house of parliament, by which the people are represented. (See PARLIAMENT). 3. Food; fare; diet (*Swift*).

COMMONWE'AL. COMMONWE'ALTH. *s.* (from *common* and *weal*, or *wealth.*) 1. A polity; an established form of civil life (*Hooker. Locke*). 2. The publick; the general body of the people (*Shakspeare*). 3. A government, in which the supreme power is lodged in the people; a republick (*Ben Jonson. Temple*).

CO'MMORANCE. CO'MMORANCY. *s.* (from *commorant.*) Dwelling; habitation; abode; residence (*Hale*).

CO'MMORANT. *a.* (*commorans*, Latin.) Resident; dwelling; inhabiting (*Ayliffe*).

COMMOTE, a term formerly used in Wales, denoting fifty villages, or half a hundred.

COMMO'TION. *s.* (*commotio*, Latin.) 1. Tumult; disturbance; combustion (*Luke*). 2. Perturbation; disorder of mind; heat; agitation (*Clarendon*). 3. Disturbance; restlessness (*Woodward*).

COMMOTION. In surgery. See CONCUSSION.

COMMO'TIONER. *s.* (from *commotion.*) A disturber of the peace: not in use (*Hayward*).

To COMMO'VE. *v. a.* (*commoveo*, Latin.) To disturb; to unsettle: not used (*Thompson*).

To CO'MMUNE. *v. n.* (*communico*, Lat.) To converse; to impart sentiments mutually (*Spenser*).

COMMUNICABI'LITY. *s.* (from *communicable.*) The quality of being communicable; capability to be imparted.

COMMU'NICABLE. *a.* (from *communicate.*) 1. That may become the common possession of more than one (*Hooker*). 2. That may be recounted (*Milton*). 3. That may be imparted (*Milton*).

COMMU'NICANT. *s.* (from *communicate.*) One who is present, as a worshipper, at the celebration of the Lord's Supper; one who participates of the blessed sacrament (*Hooker*).

To COMMU'NICATE. *v. a.* (*communico*, Lat.) 1. To impart to others what is in our own power; to bestow (*Taylor*). 2. To reveal; to impart knowledge (*Clarendon*).

To COMMU'NICATE. *v. n.* 1. To partake of the blessed sacrament (*Taylor*). 2. To

have something in common with another (*Arbuthnot*).

COMMUNICA'TION. *s.* (from *communicate.*) 1. The act of imparting benefits or knowledge (*Holder*). 2. Common boundary or inlet (*Arbuthnot*). 3. Interchange of knowledge (*Swift*). 4. Conference; conversation (*Samuel*).

COMMUNICATION OF MOTION, that act of a moving body, by which it gives motion, or transfers its motion to another body.

Father Mallebranche considers the communication of motion as something metaphysical; that is, as not necessarily arising from any physical principles, or any properties of bodies, but flowing from the immediate agency of God.

The communication of motion results from, and is an evidence of, the impenetrability and inertia of matter, as such; unless we admit the hypothesis of the penetrability of matter, advanced by Boscovich and Michell, and ascribe to the power of repulsion those effects which have been usually ascribed to its solidity and actual resistance.

But, in truth, there is an impropriety involved in the phrase communication of motion. For by reflecting on the notions that are comprised in the general conception of one body being made to move by the impulse of another, we perceive that there is nothing individual transferred from the one body to the other. The determination to motion, indeed, existed only in the impelling body before collision; whereas, afterwards, both bodies are so conditioned or determined. But we can form no idea of the thing transferred. With the same metaphysical impropriety we speak of the communication of joy, or of fever.

COMMU'NICATIVE. *a.* (from *communicate.*) Inclined to make advantages common; liberal of benefits or knowledge (*Evelyn*).

COMMU'NICATIVENESS. *s.* The quality of being communicative (*Norris*).

COMMU'NION. *s.* (*communio*, Latin.) 1. Intercourse; fellowship; common possession; interchange of transactions (*Hooker*). 2. The common or publick celebration of the Lord's Supper (*Clarendon*). 3. A common or publick act (*Raleigh*). 4. Union in the common worship of any church (*Stillingfleet*).

COMMUNION (Mixed), that kind of communion in which those who have been baptized or sprinkled in infancy, participate in receiving the Lord's Supper, with those who were baptized when adults.

COMMUNION-SERVICE, in the liturgy of the church of England, the office for the administration of the holy sacrament.

COMMUNION-TABLE, that whereon the elements of bread and wine, used in partaking of the holy sacrament, are placed.

COMMU'NITY. *s.* (*communitas*, Latin.) 1. The commonwealth; the body politick (*Atterbury*). 2. Common possession (*Locke*). 3. Frequency; commonness: not used (*Shakspeare*).

COMMUTABI'LITY. *s.* (from *commutable.*) The quality of being capable of exchange.

COMMU'TABLE. *a.* (from *commute.*) That may be exchanged for something else.

COMMUTA'TION. *s.* (from *commute.*) 1. Change; alteration (*South*). 2. Exchange; the act of giving one thing for another (*Ray*). 3. Ransom; the act of exchanging a corporal for a pecuniary punishment (*Brown*).

COMMUTATION (Angle of), in astronomy, is the distance between the sun's true place seen from the earth, and the place of a planet reduced to the ecliptic. It is equal to the difference between the sun's longitude and the heliocentric longitude of the planet.

COMMU'TATIVE. *a.* (from *commute.*) Relative to exchange.

To COMMU'TE. *v. a.* (*commuto*, Latin.) 1. To exchange; to put one thing in the place of another (*Decay of Piety*). 2. To buy off, or ransom one obligation by another (*L'Estrange*).

To COMMU'TE. *v. n.* To atone; to bargain for exemption (*South*).

COMMU'TUAL. *a.* (*con* and *mutual.*) Mutual; reciprocal (*Pope*).

COMO, a populous town of Italy, in the Milanese, with a bishop's see. It is delightfully situated in a valley, inclosed by fertile hills, on the S. extremity of a lake of the same name, anciently called Larius. Pliny was born here, and in his Letters speaks with rapture of the charming situation of the town. The present inhabitants have manufactures of cotton and silk. Lat. 45. 45 N. Lon. 9. 7 E.

COMOCLADIA. In botany, a genus of the class monandria, order monogynia. Calyx three-parted; corol three-parted; drupe oblong, with a two-lobed nut. Two species; natives of the West Indies or South America; the one with racemed axillary panicles; small, sessile, deep-red flowers inodorous. The other a tree, which if wounded, discharges a black juice, and has a stercoraceous smell. The natives believe it is fatal to sleep under it.

COMORA ISLANDS, five islands in the Indian ocean, between the coast of Zanguebar, and the north part of the island of Madagascar.

COMORRA, the principal town of a territory of the same name, in Lower Hungary. The Turks have often invested this town, and have found it so well fortified, and so ably defended, that they have constantly raised the siege, and retired with loss. The inhabitants are Hungarians and Russians; they are generally rich, and are of the Greek religion. Lat. 47. 46 N. Lon. 18. 5 E.

CO'MPACT. *s.* (*pactum*, Lat.) A contract; an accord; an agreement (*South*).

To COMPA'CT. *v. a.* (*compactum*, Latin.) 1. To join together with firmness; to unite closely; to consolidate (*Roscommon*). 2. To make out of something (*Shakspeare*). 3. To league with (*Shakspeare*). 4. To join together; to bring into a system (*Hooker*).

COMPA'CT. *a.* (*compactus*, Latin.) 1. Firm; solid; close; dense (*Newton*). 2. Composed;

consisting (*Milton*). 3. Joined; held together (*Peacham*). 4. Brief, and well connected (*Felton*).

COMPA'CTEDNESS. *s.* (from *compacted.*) Firmness; density (*Digby*).

COMPA'CTLY. *ad.* (from *compact.*) 1. Closely; densely. 2. With neat joining.

COMPA'CTNESS. *s.* (from *compact.*) Firmness; closeness; density (*Woodward*).

COMPA'CTURE. *s.* (from *compact.*) Structure; compagination (*Spenser*).

COMPA'GES. *s.* (Lat.) A system of many parts united (*Ray*).

COMPAGINA'TION. *s.* (*compago*, Lat.) Union; structure; junction (*Brown*).

COMPAGUS, in antiquity, a light summer shoe worn by the Roman senators.

CO'MPANABLENESS. *s.* (from *company.*) The quality of being a good companion; sociableness: not in use (*Sidney*).

CO'MPANIABLE. *a.* (from *company.*) Social; sociable (*Bacon*).

COMPA'NION. *s.* (*compagnon*, French.) 1. One with whom a man frequently converses (*Prior*). 2. A partner; an associate (*Milton*). 3. A familiar term of contempt; a fellow (*Raleigh*).

COMPA'NIONABLE. *a.* (from *companion.*) Fit for good fellowship; social (*Clarendon*).

COMPA'NIONABLY. *ad.* (from *companionable.*) In a companionable manner.

COMPA'NIONSHIP. *s.* (from *companion.*) 1. Company; train (*Shakspeare*). 2. Fellowship; association (*Shakspeare*).

CO'MPANY. *s.* (*compagnie*, French.) 1. Persons assembled together (*Shakspeare*). 2. An assembly of pleasure (*Bacon*). 3. Persons considered as capable of conversation and mutual entertainment (*Temple*). 4. Conversation; fellowship (*Guardian*). 5. A number of persons united for the execution of any thing; a band (*Dennis*). 6. Persons united in a joint trade or partnership. 7. A body corporate; a subordinate corporation (*Arbuthnot*). 8. A subdivision of a regiment of foot (*Knolles*). 9. *To bear* COMPANY. *To keep* COMPANY. To accompany; to associate with; to be companion to (*Shakspeare. Pope*).

COMPANY, in commerce, is an association of several merchants, or others, who unite in one common interest, and contribute by their stock, their counsel, and study, to the setting on foot, or supporting, of some lucrative establishment.

Though company and society, or fellowship, be in effect the same thing, yet custom has made a difference between them; society, or partnership, being understood of two, or three dealers, or not many more; and company usually of a greater number. A second difference between companies and societies is, that the first, especially when they have exclusive privileges, cannot be established without the concession of the prince; and need letters patent, charters, &c. Whereas, for the latter, the consent of the members, fixed and certified by acts and contracts, and authorized by bye laws, is sufficient.

The several professions and trades exercised in the city of London, being incorporated into distinct fraternities, governed by their particular laws, a tabular view of them may not be unacceptable. The account of their incorporations, and particular privileges, may be seen in the records of the Tower, or in the Firma-Burgi of Madox: they are too numerous for insertion here. But we present our readers with an alphabetical list of these companies, with the situation of their halls, and the years when they were incorporated, as follows:

Apothecaries, Blackfriars, 1606.—Armourers and Braziers, Coleman-street, 1423.—Bakers, Harp-lane, 1307.—Barbers, Monkwell-street, 1461.—Basketmakers, no hall.—Blacksmiths, Lambeth-hill, 1603.—Bowyers, no hall, 1620.—Brewers, Addle-street, 1438.—Bricklayers, Leadenhall-street, 1568.—Butchers, Pudding-lane, 1605.—Card-makers, no livery nor hall, 1629.—Carmen, no hall, 1606.—Carpenters, London-wall, 1344.—Clock-makers, no hall, 1632.—*Cloth-workers*, Mincing-lane, 1482.—Coachmakers, Noble-street, 1677.—Comb-makers, no livery nor hall, 1636.—Cooks, no hall, 1480.—Coopers, Basinghall-street, 1501.—Cordwainers, Distaff-lane, 1410.—Curriers, Cripplegate, 1367.—Cutlers, Cloak-lane, 1417.—Distillers, no hall, 1638.—*Drapers*, Throgmorton-street, 1439.—Dyers, Dowgate-hill, 1472.—Embroiderers, Gutter-lane, 1591.—Fan-makers, no livery nor hall, 1709.—Farriers, no hall, 1673.—Felt-makers, no hall, 1576.—Fishermen, no livery nor hall, 1678.—*Fishmongers*, Thames-street, 1536.—Fletchers, St. Mary-Axe.—Founders, Lothbury, 1614.—Frame-work-knitters, Red-cross-street, 1663.—Fruiterers, no hall, 1605.—Gardeners, no livery nor hall, 1616.—Girdlers, Basinghall-street, 1449.—Glass-sellers, no hall, 1664.—Glaziers, no hall, 1637.—Glovers, Beech-lane, 1638.—Gold and Silver Wire-drawers, no livery nor hall, 1623.—*Goldsmiths*, Foster-lane, 1393.—*Grocers*, Grocers-alley, 1345.—Gunsmiths, no livery nor hall, 1638.—*Haberdashers*, Maiden-lane, 1407.—Hatband-makers, no livery nor hall, 1638.—Horners, no livery nor hall, 1638.—Inn-holders, Elbow-lane, 1515.—Joiners, Friars-lane, Thames-street, 1565.—*Ironmongers*, Fenchurch-street, 1464.—Leather-sellers, Little St. Helen's, 1442.—Long Bow-string-makers, no livery nor hall.—Loriners, no hall, 1712.—Masons, Masons-alley, Basinghall-street, 1677.—*Mercers*, Cheapside, 1393.—*Merchant-Taylors*, Threadneedle-street, 1466.—Musicians, no hall, 1604.—Needle-makers, no hall, 1656.—Painter-stainers, Little Trinity-lane, 1582.—Parish-clerks, Silver-street, Wood-street, 1233.—Patten-makers, no hall, 1670.—Paviours, no livery nor hall.—Pewterers, Lime-street, 1474.—Pin-makers, no livery, nor hall, 1636.—Plaisterers, Addle-hill, 1501.—Plumbers, Dowgate-hill, 1611.—Porters, no livery nor hall.—Poulterers, no hall, 1504.—Sadlers,

Cheapside, 1290.—*Salters*, St. Swithin's-lane, 1558.—Scriveners, Noble-street, 1616.—Shipwrights, no livery nor hall, 1605.—Silkmen, no livery nor hall, 1631.—Silk-throwsters, no livery nor hall, 1630.—*Skinners*, Dowgate-hill, 1327.—Soap-makers, no livery nor hall, 1638.—Spectacle-makers, no livery nor hall, 1630.—Starch-makers, no livery nor hall, 1622.—Stationers, Ludgate-street, 1557.—Surgeons, Portugal-street, no livery, 1463.—Tallow-chandlers, Dowgate-hill, 1463.—Tin Plate Workers, no hall, 1670.—Tobacco Pipe-makers, Philpot-lane, 1663.—Turners, College-hill, 1604.—Tylers and Bricklayers, Leadenhall, 1568.—*Vintners*, Thames-street, 1437.—Upholders, Leadenhall-street, 1627.—Watermen, near London-bridge.—Wax-chandlers, Maiden-lane, 1483.—Weavers, Basinghall-street, 1169.—Wheelwrights, no livery nor hall, 1670.—Woodmongers, no livery nor hall.—Woolmen, no livery nor hall. The twelve principal companies are printed in Italic; of one or other of these the lord-mayors have generally made themselves free at their election.

COMPANY seems more particularly appropriated to those grand associations set on foot for the commerce of the remote parts of the world, and vested by charter with peculiar privileges. When companies do not trade upon a joint stock, but are obliged to admit any person, properly qualified, upon paying a certain fine and agreeing to submit to the regulations of the company, each member trading upon his own stock and at his own risk, they are called regulated companies. When they trade upon a joint stock, each member sharing in the common profit or loss, in proportion to his share in this stock, they are called joint-stock companies. Such companies, whether regulated, or joint-stock, sometimes have, and sometimes have not, exclusive privileges.

1. *The Hamburgh Company* is the oldest trading establishment in the kingdom; though not always known by that name, nor restrained to those narrow bounds under which it is now confined. It was first called the Company of Merchants trading to Calais, Holland, Zealand, Brabant, and Flanders: then it acquired the general title of Merchant-adventurers of England: as being composed of all the English merchants who traded to the Low Countries, the Baltic, and the German ocean. Lastly, it was called the Company of Merchant-adventurers of England trading to Hamburgh. This company was first incorporated by Edward I. in 1296; and their privileges have been confirmed by many of his successors. The revolutions which happened in the Low Countries towards the end of the sixteenth century, and which laid the foundation of the republic of Holland, having hindered the company from continuing their commerce with their ancient freedom, it was obliged to turn it almost wholly to the side of Hamburgh, and the cities on the German ocean; from which change some people took occasion to change its name to that of the Hamburgh Company; though the ancient title of Merchant-adventurers is still retained in all their writings.

2. *The Russia Company* was first projected towards the end of the reign of king Edward VI. and executed in the first and second years of Philip and Mary; its charter was confirmed by act of parliament, under queen Elizabeth, in 1566. It had its rise from certain adventurers, who were sent in three vessels on the discovery of new countries; and to find out a north-east passage to China: these, falling into the White Sea, and making up to the port of Archangel, were exceedingly well received by the Muscovites; and at their return, solicited letters-patent to secure to themselves the commerce of Russia, for which they had formed an association. This company subsisted with reputation almost a whole century, till the time of the civil wars. It is said, the czar then reigning, hearing of the murder of king Charles I. ordered all the English in his states to be expelled; which the Dutch taking the advantage of, settled in their room. After the Restoration, the remains of the company re-established part of their commerce at Archangel, but never with the same success as before. This company subsists still, under the direction of a governor, four consuls, and assistants; and by the 10th and 11th of William III. c. 6. the fine for admission was reduced to 5l.

3. *The Eastland Company* was incorporated by queen Elizabeth. Its charter is dated in the year 1579. By the first article the company is erected into a body politic, under the title of the Company of Merchants of the East; to consist of Englishmen, all real merchants, who have exercised the business thereof, and trafficked through the Sound, before the year 1568, into Norway, Sweden, Poland, Livonia, Prussia, Pomerania, &c. excepting Narva, Muscovy, and its dependencies. Most of the remaining articles grant them the usual prerogatives of such companies; as a seal, governor, courts, laws, &c. This company was complained of as a monopoly, and first curtailed by legal authority in 1672; and since the declaration of rights in 1689, exist only in name; but still continue to elect their annual officers, who are a governor, a deputy, and twenty-four assistants.

4. *The Turkey or Levant Company*, had its rise under queen Elizabeth, in 1581. James I. confirmed its charter in 1605, adding new privileges. During the civil wars, there happened some innovations in the government of the company; many having been admitted members, not qualified by the charters of queen Elizabeth and king James, or that did not conform to the regulations prescribed. Charles II. upon his restoration, endeavoured to set it upon its ancient basis; to which end, he gave them a charter, containing not only a confirmation of their old one, but also several new articles of reformation. By this, the company is erected into a body politic, capable of making laws, &c. under the title of the Company of Merchants of England trading to the Seas of

the Levant. The number of members is not limited, but is ordinarily about three hundred. The principal qualification required is, that the candidate be a freeman of London, and a wholesale merchant, either by family, or serving an apprenticeship of seven years. The company has a court or board at London, which is composed of a governor, deputy-governor, and fifteen directors or assistants; who are all actually to live in London or the suburbs. They have also a deputy-governor in every city and port, where there are any members of the company. The assembly at London sends out two vessels, regulates the tariff for the price at which the European merchandizes sent to the Levant are to be sold, and for the quality of those returned.

5. *The Company of Merchants trading to Africa*, established in 1750. Contrary to the former practice with regard to regulated companies, who were reckoned unfit for such sort of service, this company was subjected to the obligation of maintaining forts and garrisons. The act which establishes this company (23 Geo. II. c. 31) seems to have had two distinct objects in view; first to restrain effectually the oppressive and monopolizing spirit which is natural to the directors of a regulated company; and secondly, to force them as much as possible to give an attention, which is not natural to them, towards the maintenance of forts and garrisons.

The principal joint-stock companies at present subsisting in Great Britain are, the South Sea and East India companies; to which may be added, though of very inferior magnitude, the Hudson's Bay company.

1. *The South Sea Company*. During the long war with France in the reign of queen Anne, the payment of the sailors of the royal navy being neglected, they received tickets instead of money, and were frequently obliged, by their necessities, to sell those tickets to avaricious men at a discount of 40 and sometimes 50 per cent. By this and other means, the debts of the nation unprovided for by parliament, and which amounted to 9,471,321*l.* fell into the hands of these usurers. On which Mr. Harley, at that time chancellor of the exchequer, and afterwards earl of Oxford, proposed a scheme to allow the proprietors of these debts and deficiencies 6 per cent. per annum, and to incorporate them for the purpose of carrying on a trade to the South Sea; and they were accordingly incorporated under the title of the Governor and Company of Merchants of Great Britain trading to the South Seas, and other parts of America, and for encouraging the Fishery, &c.

Though this company seem formed for the sake of commerce, the ministry never thought seriously, during the course of the war, about making any settlement on the coast of South America, which was what flattered the expectations of the people; nor was it ever carried into execution by this company. Other sums were lent to the government in the reign of Anne. In the reign of George I. the interest of the whole was reduced to 5 per cent. The company kept decaying, however, till about the year 1773.

By the treaty of Utrecht, the business of the French Assiento company, which was to furnish the Spanish West Indies with negroes, was resigned to the English, in favour of the South Sea company; which, by this turn, relieved itself from its languishing situation, and became in a condition to vie with the most flourishing companies of commerce in England. The South Sea company, who, without changing their name, took on them the Assiento, or farm of negroes, preserved the same establishment, until the peace of Aix-la-Chapelle, in 1748; and their vessels disembarked their negroes, which they had purchased through all the coasts of Africa within their grant, at Buenos Ayres.

The company, it is certain, set out with good success; and there was room to hope still better; since, besides that the value of their stock, the first five years, rose faster, in proportion, than that of any other company; his majesty, after purchasing 10,000*l.* sterling therein, was pleased to condescend to be their governor, or first director. This company is under the management of a sub-governor, deputy-governor, and twenty-one directors, chosen every three years; for which a qualification of 2000*l.* stock is sufficient, and for an elector 500*l.*

2. *The East India Company*. The first, or as it is called the Old East India Company, was established by a charter from queen Elizabeth in 1600; but for some time the partners seem to have traded with separate stocks, though only in the ships belonging to the whole company. In 1612, they joined their stocks into one common capital; and though their charter was not as yet confirmed by act of parliament, it was looked upon in that early period to be sufficiently valid, and no body ventured to interfere with their trade. At this time their capital amounted to about 740,000*l.* and the shares were as low as 50*l.* Their trade was in general successful, notwithstanding some heavy losses, chiefly sustained through the malice of the Dutch East India company. In process of time, however, it came to be understood that a royal charter could not by itself convey an exclusive privilege to traders, and the company was reduced to distress by reason of the multitude of interlopers who carried off the most of their trade. This continued during the latter part of the reign of Charles II. the whole of that of James II. and part of William III. when in 1698 a proposal was made to parliament for advancing the sum of 2,000,000*l.* to government, on condition of erecting the subscribers into a new company with exclusive privileges. The old company endeavoured to prevent the appearance of such a formidable rival, by offering government 700,000*l.* nearly the amount of their capital at that time; but such were the exigencies of the state, that the

larger sum, though at eight per cent. interest, was preferred to the smaller at one half the expence.

Thus were two East India companies erected in the same kingdom, which could not but be very prejudicial to each other. Through the negligence of those who prepared the act of parliament also, the new company was not obliged to unite in a joint-stock. The consequence of this was, that a few private traders, whose subscriptions scarce exceeded 7200*l*. insisted on a right of trading separately at their own risk. Thus a kind of third company was established; and by their mutual contentions with one another, all the three were brought to the brink of ruin. Upon a subsequent occasion, in 1700, a proposal was made to parliament for putting the trade under the management of a regulated company, and thus laying it in some measure open. This, however, was opposed by the company, who represented in strong terms the mischiefs likely to arise from such a proceeding. In 1702 the companies were in some measure united by an indenture tripartite, to which the queen was the third party; and in 1708, they were, by act of parliament, perfectly consolidated into one company by their present name of The United Company of Merchants trading to the East Indies. Into this act it was thought worthy to insert a clause, allowing the separate traders to continue their traffic till Michaelmas 1711, but at the same time empowering the directors, upon three years notice, to redeem their capital of 7200*l*. and thereby convert the whole capital of the company into a joint stock. By the same act, the capital of the company, in consequence of a new loan to government, was augmented from 2,000,000*l*. to 3,200,000*l*. In 1743, another million was advanced to government. But this being raised, not by a call upon the proprietors, but by selling annuities and contracting bond-debts, it did not augment the stock upon which the proprietors could claim a dividend. Thus, however, their trading stock was augmented; it being equally liable with the other 3,200,000*l*. to the losses sustained, and debts contracted by the company, in the prosecution of their mercantile projects. From 1711, this company, being freed from all competitors, and fully established in the monopoly of the English commerce to the East Indies, carried on a successful trade; and from their profits made annually a moderate dividend to their proprietors.

From this period the East India company has occupied a very important station in the commercial interests of this country; and an account of the various legislative provisions which have been made for its support and regulation may be found incorporated in most of the histories of England.

The amount of all goods sold at the East India company's sales, from March 1, 1805, to March 1, 1806, was 8,781,442*l*. The revenues in India for the year 1806-7, was 14,847,239*l*. The charges there in the same period, 16,804,010*l*. Deficiency, 1,956,771*l*. Actual receipts in Great Britain for one year, ending March 1, 1807, 13,288,527*l*. Payments here in the same time, 12,778,548*l*. Cash in the treasury, March 1, 1807, was 511,978*l*. 16*s*. 4*d*.

The company is under the management of twenty-four directors, elected by the proprietors of the company's stock, who hold 1000*l*. or upwards. Such proprietors are likewise entitled to vote on all occasions, in the quarterly and special general courts of the company.

The possessor of 1000*l*. stock has one vote; 3000*l*. two votes; 6000*l*. three votes; 10,000*l*. four votes. The number of proprietors entitled to vote, on the 8th of April, 1800, was 2163, and the number of votes 2832.

For some interesting though alarming particulars relative to the finances of this company, and the progress of its debt, see Edinburgh Review, vol. iv. p 312.

3. *Hudson's Bay Company*. The vast countries which surround Hudson's Bay abound with animals whose furs and skins are excellent, being far superior in quality to those found in less northerly regions. In 1670, a charter was granted to a company, which does not consist of above nine or ten persons, for the exclusive trade to this bay; and they have acted under it ever since with great benefit to themselves. The company employ four ships and 130 seamen. They have several forts, viz. Prince of Wales's fort, Churchill river, Nelson, New Severn, and Albany, which stand on the west side of the bay, and are garrisoned by 186 men. The French, in May 1782, took and destroyed these forts, and the settlements, &c. valued at 500,000*l*. They export commodities to the value of 16,000*l*. and bring home returns to the value of 29,340*l*. which yield to the revenue 3734*l*. This includes the fishery in Hudson's Bay. This commerce, small as it is, affords immense profits to the company, and even some advantages to Great Britain in general: for the commodities we exchange with the Indians for their skins and furs are all manufactured in Britain; and as the Indians are not very nice in their choice, such things are sent of which we have the greatest plenty, and which, in the mercantile phrase, are drugs with us. And although the workmanship happens to be in many respects so deficient, that no civilized people would take it off our hands, it may be admired among the Indians. On the other hand, the skins and furs we bring from Hudson's Bay enter largely into our manufactures, and afford us materials for trading with many nations of Europe to great advantage. These circumstances tend to prove incontestably the immense benefit that would result to Great Britain, by throwing open the trade to Hudson's Bay, since even in its present restrained state it is so advantageous. This company, it is probable, do not find their trade so advantageous now as it was before we got possession of Canada. The only attempt made to trade with Labrador has been directed to-

wards the fishery, the annual produce of which exceeds 49,000*l*.

Sierra Leone Company. See SIERRA LEONE.

COMPANY (Rule of). See FELLOWSHIP.

To CO'MPANY. *v. a.* (from the noun.) To accompany; to be associated with (*Shakspeare*).

To CO'MPANY. *v. n.* To associate one's self with (*Corinthians*).

CO'MPARABLE. *a.* (from *compare*.) Worthy to be compared; of equal regard (*Addison*).

CO'MPARABLY. *ad.* (from *comparable*.) In a manner worthy to be compared (*Wotton*).

COMPA'RATES. *s.* (from *compare*.) In logick, the two things compared to one another.

COMPA'RATIVE. *a.* (*comparativus*, Lat.) 1. Estimated by comparison; not absolute; not positive (*Bentley*). 2. Having the power of comparing (*Glanville*). 3. (In grammar.) The comparative degree expresses more of any quantity in one thing than in another: as, the right hand is the stronger.

COMPARATIVE ANATOMY. Zootomy; or the dissection of other animal bodies than that of man, to compare them with the human: a study of great importance to the medical and chirurgical pupil, and less attended to than it deserves to be. It is from an ignorance of this branch of science that persons of tolerably good education are apt to conceive that the system or mode of operation actually before them, is the only system that could have been devised for producing the effect exhibited: instead of which the vast variety of systems or modes of operation evinced in the structure of different animals and vegetables, by means of which the very same result is accomplished, prove incontrovertibly, that the great Author of nature in employing one system rather than another, does not employ it because it is the only system present to his unlimited survey, or the only system that could answer the end proposed, but merely that out of an infinite variety of systems all equally competent and equally present, he must necessarily make a choice, and can only employ one of them at one time and for one purpose. The existence of a heart and the alternate contraction and dilatation of the muscular tunics of the arteries, are supposed by the greater part of mankind to be actually necessary for the circulation of the blood. The physiologist, however, by the use of zootomy, discovers, that there are at least as many tribes of animals, if not more, who have no heart whatever, or at least none adapted to a general circulation, and that immense numbers of animals have neither muscular fibre nor nerve. The double hearts of mammals and birds, produce the double circulation of the blood; first from the heart through the lungs, and next from the heart through the remainder of the body. Yet the same double circulation is produced in amphibials and fishes, and many inferior animals who have nothing more than a single heart; that is, nothing more than a single auricle and ventricle; and in others where there is no heart whatever; the propelling power being altogether of a different description, and yet as competent to the fulfilment of its object as that resulting from an arterial systole, and diastole. The heart of fishes moreover, propels the blood, not through the system at large, but only through the lungs or bronchia; while the snail, on the contrary, has what may be called a corporeal but not a pulmonary heart: it propels the blood, by means of an auricle or ventricle, over the system, but has no heart for the lungs. While again in all coleopterous insects, and perhaps in all others that are possessed of wings, the single heart, or auricle and ventricle, operates in both directions, and is sufficient to produce of itself the same kind of double circulation that is traced in man, quadrupeds, the cetaceous tribe, and birds, by the machinery of a double heart. In such insects, moreover, both the lungs and heart are equally diffused through the whole length of the body; while in man and all other mammals both the lungs and heart are confined to the chest.

In the article BOTANY we have observed that the vegetable blood, or sap, circulates through the vessels of the plant as accurately as the animal blood circulates through that of animals; and, as a great variety of experiments would induce us to believe, by the propelling power of a regular systole and diastole. But plants have neither brain nor heart, neither muscle nor nerve. We are ignorant of the primum mobile of this propulsion; we know it to be a cause perfectly different from that which operates in the higher classes of animals; and perhaps in every class of animals; but though the cause be widely different, we see the very same effect produced as punctually and as permanently.

Sponge, coral, and other zoophytic animals, are supposed to derive their nutriment from suction or capillary attraction: but mere capillary attraction can never produce an accretion of the substance that constitutes the individual animal, nor convert the sea-water on which it feeds into carbonat of lime and ammonia, or into the peculiar structure and powers which characterise such apparently insentient worms.

Yet perhaps neither sponges nor corols, nor any animals of the zoophytic order, are insentient. From our limited acquaintance with the works of nature we are too apt to ascribe the possession of sense and perception to the organ of the brain alone. But the zootomist, or comparative anatomist, traces the existence of these qualities in a thousand instances, in which the brain is as different from the common substance of the organ we so denominate, as this organ is from the substance of the lungs; and in thousands of other instances, in which there is no organ that can have any pretensions to such an appellation. In man and quadrupeds the cortical substance of the brain is placed exteriorly, and the ventricles, situated in the whiter part, interiorly. In birds and fishes this order is precisely reversed: for here the ventricles are exterior, and the cortical substance within. The reptile tribes have very little brain; and what they have they may often be dispossessed of for months, and still continue to exist, particularly the tortoise genus. Most insects have no brain at all, but only a small nervous chord, something like the spinal marrow, but which, nevertheless, is not marrow. Polypes, and hydatids, have unquestionably neither brain nor nerves; nor have any nerves been discovered in the oyster. This, however, if we had space for so comprehensive a detail, would rather lead us to the general subject of PHYSIOLOGY, under which article we shall pursue it somewhat more at large, than quadrate with that individual

branch of physiology which is comprehended under the term Zootomy, or Comparative Anatomy.

We shall proceed, therefore, to offer a summary view of those chief distinctions which occur in the dissection of animals inferior to man in the various classes and orders of quadrupeds, birds, amphibials, fishes, insects, and worms.

Quadrupeds.

All animals of this name have a covering of hair, wool, &c. to defend them from the injuries of the weather, which varies in thickness according to the season of the year, and difference of the climate: thus in Russia and the northern countries, the furs are very thick and warm, while the little Spanish lap-dogs, and Barbary cows, have little or no hair at all.

The cutis and cuticula in quadrupeds are disposed much in the same way as the human, but are more elastic; immediately under this there is a very thin cutaneous muscular substance called panniculus carnosus; which is common to all quadrupeds, the porcine kind excepted; this principally covers the trunk, serving to shrivel the skin, in order to drive off insects, their tails and heads not being sufficient for this purpose, while their extremities are employed in their support and progression.

It has probably been from observing some muscles of the human body, such as the platysma myoides, cremaster, and frontales, and the collapsed tunica cellulosa of emaciated subjects, to resemble this thin muscle, that some of the older anatomists reckoned such a panniculus among the common teguments of the human body. This Carolus Stephanus has well observed.

Most part of quadrupeds want clavicles, whereby their anterior extremities fall upon their chest, so as to make their thorax proportionally narrower than the human. This small distance of their anterior extremities is very necessary for their uniform progression: apes indeed and squirrels have clavicles to allow them a more full use of their extremities in climbing, but when they sit down on all-four they walk but indifferently.

Dog: and the Canine Tribe generally.

We may first observe of this animal, as indeed of most quadrupeds, that its legs are much shorter in proportion to its trunk than in man, the length of whose steps depends entirely on the length of his inferior extremities; however, to balance this, the trunk of the animal is proportionably longer and smaller, his spine more flexible, by which he is able at each step to bring his posterior extremities nearer to his anterior. His common teguments are much a-kin to those of other quadrupeds, only they allow little or no passage for sweat, whence when he is overheated, the superfluous matter finds an exit by the salivary glands, for he then lolls out his tongue and slavers plentifully.

The pyramidal muscles are wanting, to supply which the rectus is inserted fleshy into the os pubis.

The omentum reaches down to the os pubis, which, considering the posture of the animal, we shall find to be a wise provision, since its use is to separate an oily liquor for lubricating the intestines and facilitating their peristaltic motion.

This animal's stomach, though pretty much resembling the human in its shape, is somewhat differently situated. It lies more longitudinally, as indeed all the other viscera do, to accommodate themselves to the shape of the cavity in which they are contained, that is, its inferior orifice is much farther down with respect to the superior than the human: by this means the gross food has an easier passage into the duodenum. The rugæ of the tunica villosa are neither so large nor situated transversely as in the human, but go from one orifice to the other; the reason of which difference is, perhaps, that they might be in less danger of being hurt by the hard substances this creature frequently feeds upon, and for the same reason there is not the like coarction at their pylorus.

The intestines of this animal are proportionally much shorter than ours, for the food which these creatures mostly use soon dissolves, and then putrifies; on which account there was no occasion for a long tract of intestines, but on the contrary that it should be quickly thrown out of the body: the same is to be observed of all the carnivorous animals. The muscular coat of the intestines is also stronger than the human, to protrude the hard bones, lest they should stop somewhere in the canal.

The valvulæ conniventes are less numerous, and in a longitudinal direction.

The duodenum differs considerably in its situation from the human; for in man it first mounts from the pylorus upwards, backwards, and to the right side, then passes down by the gall-bladder, and marching over the right kidney and superior part of the psoas muscles, makes a curvature upwards, and passes over the back bone and vena cava inferior, to the left hypochondrium, where it gets through the omentum, mesentery and mesocolon to commence the jejunum, being firmly tied down all the way, the biliary and pancreatic ducts entering at its most depending part: whereas in the dog the duodenum is fixed at the pylorus to the concave surface of the liver, and hangs loose and pendulous with the mesentery backwards into the cavity of the abdomen, then turning up again is fixed to the back-bone where it ends in the jejunum; the bile and pancreatic juice are poured into it at the most depending part; therefore the same intention seems to have been had in view in the formation of this part in both, viz. the giving the chyle, after the liquors of the liver and pancreas are poured into it, a disadvantageous course, that so it might be the more intimately blended with the humours before its entry into the jejunum, where the lacteals are very numerous: and thus by reason of their different posture, the same design (though by a very different order of the parts) is brought about in both.

The other small intestines are much the same with ours, only shorter. The great intestines are also shorter and less capacious than in the human body; and we take it for a general rule, that all animals that live on vegetable food have not only their small intestines considerably longer, but also their great ones more capacious than such creatures as feed on other animals. Hence man from this form of his intestines and that of the teeth, seems to have been originally designed for feeding on vegetables, and still the most of his food and all his drink is of that class.

At the extremity of the intestinum rectum or verge of the anus, there are found two bags or paunches, which contain a most abominable fetid mucus, for which no use is known unless it serve to lubricate the strained extremity of the rectum, and defend it against the asperity of the fæces, or to separate some liquor that might otherwise prove hurtful to their bodies. There is nothing analogous to those sacs in the human subject,

unless we reckon the mucilaginous glands that are found most frequent and largest about the lower part of the rectum.

The mesentery is considerably longer than in the human body. The spleen differs very much, both in figure and situation. It is more oblong and thin, and lies more according to the length of the abdomen, like the pancreas.

The human liver has no fissures or divisions, unless we reckon that small one betwixt the two pylæ, where the large vessels enter: whereas in the dog and all other animals that have a large flexion in their spine, as lions, leopards, cats, and most others of the feline genus, the liver and lungs are divided into a great many lobes by deep sections, reaching the large blood-vessels, which in great motions of the back-bone may easily slide over one another, and so are in much less danger of being torn or bruised, than if they were formed of one entire piece, as we really see it in horses, cows, and such animals as have their back-bone stiff and immoveable.

The urinary bladder differs considerably from the human, and especially in its form, which is pyramidal or pyriform; a shape common to all quadrupeds, except the ape and others of an erect posture. It is, moreover, a general rule, that those creatures that feed upon animal food have their bladder more muscular and considerably stronger, and less capacious than those that live on vegetables, such as horses, cows, swine, &c. whose bladder of urine is perfectly membranous, and very large.

The spermatic vessels are much the same way disposed as in us.

The scrotum is shorter and not so pendulous; this it has in common with all the dog kind that want the vesiculæ seminales, who have it closely tucked up, that the seed at each copulation might the sooner be brought from the testes, thus in some measure supplying the place of the vesiculæ seminales; for the course of the seed through the vasa deferentia is thus shortened by placing the secerning vessels nearer the excretory organs. This at the same time explains the reason why this creature is so tedious in copulation.

The uterus of multifarious animals is little more than a continuation of their vagina, only separated from it by a small ring or valve. From the uterus two long canals mount upon the loins, in which the fetuses are lodged; these are divided into different sacs, which are strongly constricted betwixt each fetus, yet these coarctions give way in the time of birth. From these go out the tubæ Fallopianæ, so that the ovaria come to lodge pretty near the kidneys.

The disposition and situation of the mammæ vary in animals, as they bear one or more young. Those of the uniparous kind have them placed between the posterior extremities, which in them is the highest part of their bodies, whereby their young get at them without the inconvenience of kneeling; nevertheless, when the creatures are of no great size, and their breast large, as in sheep, the young ones are to take this posture. In multifarious animals they must have a great number of nipples, that their several young ones may have room at the same time, and these disposed over both thorax and abdomen: and the creatures generally lie down when their young are to be suckled, that they may give them the most favourable situation. Whence it does not appear to be from any superior fitness of the vessels at certain places, for giving a proper nourishment to the child, that the breasts are so placed in women, as we find them, but really from that situation being the most convenient, both for mother and infant.

The heart is situated with its point almost directly downwards, according to the creature's posture, and is but very little inclined to the left-side. Its point is much sharper, and its shape more conoidal than the human. Here the names of right and left ventricles are proper enough, though not so in the human, which ought rather to be called anterior and posterior, or superior and inferior. The animal has the vena cava of a considerable length within the thorax, having nearly the whole length of the heart to run over ere it gets at the sinus Lowerianus dexter. In men, as soon as it pierces the diaphragm, it enters the pericardium, which is firmly attached to it, and immediately gets into the sinus Lowerianus; which sinus in the human subject, by the oblique situation of the heart, is almost contiguous to the diaphragm, and by this we discover that several authors have taken their delineations of the human heart from brutes, which is easily detected by the shape and situation of the heart, and long vena cava within the thorax.

We look on it as a general rule, that all quadrupeds, as having occasion to gather their food from the ground, are provided with longer necks than man; but as a long neck not only gives the advantage of a long lever to the weight of the head, but when the animal is gathering his food, makes the brain in danger of being oppressed with too great a quantity of blood, by the liquor in these arteries having the benefit of a descent, while that in the veins must remount a considerable way contrary to its own gravity, it was therefore necessary that a part of the length of the neck should be supplied by the length of the jaws. Thus we see horses, cows, &c. who have no occasion for opening their mouths very wide, yet have long jaws. Bull dogs indeed, and such animals as have occasion for very strong jaws, must of necessity have them short; because the longer they are, the resistance to be overcome acts with a longer lever. Another exception to this general rule, is, such animals as are furnished with something analogous to hands to convey their food to their mouths. The teeth of this creature plainly shew it to be of the carnivorous kind, for there are none of them made for grinding their food, but only for tearing and dividing it. Even its posterior teeth are not formed with rough broad surfaces as ours are; but are made considerably sharper, and press over one another when the mouth is shut, that so they may take the firmer hold of whatever comes betwixt them.

The tongue, in consequence of the length of the jaws, is much longer than ours; and as this creature feeds with his head in a depending posture, the morsel just taken in would always be in danger of falling out of the mouth, were it not for several prominences placed mostly at the root of the tongue, and crooked backwards in such a manner, as to allow any thing to press easily down to the jaws, but to hinder its return. In some animals who feed on living creatures, these under hooks are still more conspicuous, especially in several large fishes, where they almost rival the teeth in the fore part of their mouth, and are nearly as firm and strong.

In this subject there is no uvula, but then the epiglottis, when pressed down, covers the whole

rima entirely, and naturally continues so; there is therefore a ligament or rather muscle that comes from the os hyoides and root of the tongue that is inserted into that part of the epiglottis, where it is articulated with the cricoid cartilage which serves to raise it from the rima, though not so strongly but that it may with a small force be clapped down again. If then in all such animals as have no uvula, the epiglottis is so ordered as to be capable of covering the rima entirely, and if in man the epiglottis cannot be so pressed backwards and downwards, as to shut up the glottis perfectly, but leaves a space that can be exactly filled up by the uvula, we may very reasonably conclude that the use of this part is to supply this deficiency in the epiglottis.

The nose is generally longer than in man, and its external passage much narrower. The internal structure is also better adapted for an acute smelling, having a larger convoluted surface on which the membrana scheideriana is spread, and this is to be observed in most quadrupeds, who have the ossa spongiosa commonly large, and these too divided into a great number of excessively fine thin lamelæ. The elephant, which has a head pretty large in proportion to its body, has the greatest part of it taken up with the cavity of the nose and frontal sinusses, which last extend almost over their whole head, and leaves but a small cavity for their brains. A very nice sense of smelling was not so absolutely necessary for man, who has judgment and experience to direct him in the choice of his food; whereas brutes, who have only their senses, must have these of necessity acute, some having one sense in greater perfection than others, according to their different way of life. We not only conclude *à priori* from the large expanded membrana scheideriana that their sense of smelling is very acute, but we find it so by cows and horses distinguishing so readily betwixt noxious and wholesome herbs, which they do principally by this sense.

The external ear in different quadrupeds is differently framed, but always calculated to the animal's manner of life: in shape it commonly resembles the oblique section of a cone from near the apex to the basis. Hares and such other animals as are daily exposed to insults from beasts of prey, have large ears directed backwards, their eyes warning them of any danger before; rapacious animals, on the other hand, have their ears placed directly forwards, as we see in the lion, cat, &c. The slow hounds and other animals that are designed to hear most distinctly the sounds coming from below, have their ears hanging downwards. Man again, who must equally hear sounds coming from all quarters, but especially such as are sent from about his own height, has his external ear placed in a vertical manner, somewhat turned forward. In short, wherever we see a speciality in the make of this organ in any creature, we may with very little reflection discover this form to be more convenient for that creature than another. There are some differences to be observed in the structure of the internal ear in different animals; but we know so very little of the use of the particular parts of that organ in the human subject, that it is altogether impossible to assign reasons for these variations in other creatures.

All quadrupeds have at the internal canthus of the eye a strong firm membrane with a cartilaginous edge, which may be made to cover some part of their eye, and this is greater or less in different animals, as their eyes are more or less exposed to dangers in searching after their food: this membrana nictitans, as it is called, is not very large in this animal; cows and horses have it so large as to cover one half of the eye like a curtain, and at the same time is transparent enough to allow abundance of the rays of light to pass through it; fishes have a cuticle always over their eyes, as they are ever in danger in that inconstant element. In this then we may also observe a sort of gradation.

All quadrupeds have a seventh muscle belonging to the eye, called suspensorius. It surrounds almost the whole optic nerve, and is fixed into the sclerotic coat as the others are; its use is to sustain the weight of the globule of the eye, and prevent the optic nerve being too much stretched, without obliging the four straight muscles to be in a continual contraction, which would be inconvenient. At the same time this muscle may be brought to assist any of the other four, by causing one particular portion of it to act at a time.

The next thing to be remarked is the figure of the pupil, which is different in different animals, but always exactly accommodated to the creature's way of life. Man has it circular for obvious reasons; an ox has it transverse, to take in a larger view of his food: cats again have theirs somewhat perpendicular, (but can alter it pretty much) for a similar reason, and so of the rest; the pupil of different animals varies in width, according as the internal organs of vision are more or less acute; thus cats and owls who seek their prey in the night, or in dark places (and consequently must have their eyes so formed as that a few rays of light may make a lively impression on the retina), have their pupils in day time contracted into a very narrow space, as a great number of rays would oppress their nice organs, while in the night they dilate considerably. In the same way when the retina is inflamed, a great number of rays of light would occasion a painful sensation, therefore the pupil is contracted; on the contrary, in dying people, or in a beginning amaurosis, it is greatly dilated, as the eyes on such occasions are very difficultly affected, and as it were insensible.

The posterior part of the choroid coat, which is called tapetum, is of different colours in different creatures. Oxen feeding mostly on grass have this membrane of a green colour, that it may reflect upon the retina all the rays of light which come from objects of that colour, while other rays are obscured; thus the animal sees its food better than other objects. Cats and owls have their tapetum of a whitish colour, and for the same reasons have the pupil very dilatable, and their organs of vision acute; and we shall find that all animals see more or less distinctly in the dark, according as their tapetum approaches nearer to a white or black colour. Thus dogs who have it of a greyish colour distinguish objects better in the night than man, whose tapetum is dark brown, and who, I believe, sees worst in the dark of any creature, it being originally designed that he should rest from all kinds of employments in the night time. The difference then of the colour of the tapetum, as indeed the fabric of any other part in different creatures, always depends on some particular advantage accruing to the animal in its peculiar manner of life from this singularity.

The brain in all quadrupeds is proportionally much smaller than in man. The reason of which

may be, that as quadrupeds for the most part seek their food with their heads in a depending posture, this situation would make it very inconvenient for the brain itself to send its animal spirits (or its influence and energy, be it what it will) through the nerves, so that it was necessary they should be supplied from somewhere else, and consequently there was no reason for the brain itself being of a great bulk.

The structure of the brain differs but very little in all quadrupeds, and it is hence needless to pursue this subject any farther.

Ruminant Kind.

The next tribe of quadrupeds we have proposed to consider is the ruminant kind, of which we have an example in the cow, and accordingly shall take the fetus of the animal in utero, that we may first remark some things that are peculiar to it in that state, and afterwards proceed to examine the peculiarity of its viscera.

The form of a cow's uterus differs from the human, in having two pretty large cornua. This is common to it with other brutes, for a bitch has two long cornua uteri; but these again differ (as being multiparous and uniparous) in this, that in the bitch's cornua the fetuses are contained, whereas here there is only part of the secundines, being mostly the allantois with the included liquor. The muscular fibres of the uterus are more easily discovered; its internal surface has a great number of spongy, oblong, protuberant, glandular bodies fixed to it by a fine membrane: these are composed of several large vessels of the uterus terminating here. These are very small, and sometimes not to be observed at all. In an impregnated uterus we can easily press out of them a chylous mucilaginous liquor; they are composed of a great many processes or digiti, and deep caverns answering to as many processes and caverns of the placenta. Their resemblance has occasioned the name of papillæ to be given them, and hence it was that Hippocrates was induced to believe, that the fetus sucked in utero. It is not easy to determine, whether the uterus grows thicker or thinner in the time of gestation. The membranes it is plain (by the stretching of the parts) must be made thinner, but then it is as evident, that the vessels are at that time enlarged, upon which principally the thickness of any part depends; so there seems to be as much gained the one way, as lost the other. The os uteri is entirely shut up by a glutinous, mucilaginous substance, that is common to the females of all creatures when with young; by this the external air is excluded, which would soon make the liquors corrupt; it also prevents the inflammation of the membranes, and the hazard of abortion. By this means also the lips of the womb are kept from growing together, which otherwise they would certainly at this time do. There are mucous glands placed here to secern this gluten, which on the breaking of the membranes with the contained waters produces a soap that lubricates and washes the parts, and makes them easily yield.

We come now to consider the ox tribe as a ruminant animal. There are no dentes incisores in the upper jaw, but the gums are pretty hard, their tongue rough, and they supply this defect by wrapping their tongue round a tuft of grass, so pressing it against the upper jaw keep it stretched, and cut it with the teeth of the under-jaw; then, without chewing, throw it down into the œsophagus, which, in these creatures, consists of a double row of spiral fibres decussating one another. All animals which ruminate must have more ventricles than one, some two, some three, our present subject has no less than four. The food is carried directly down into the first, which lies upon the left side and is the largest of all; it is called γαςηρ ventriculus, and κοιλια by way of eminence. It is what is called by the general name of paunch by the vulgar. There are no rugæ upon its internal surface; the food, by the force of its muscular coat, and the liquors poured in here, is sufficiently macerated, after which it is forced up hence by the œsophagus into the mouth, and there it is made very small by mastication; this is what is properly called chewing the cud or rumination; after this it is sent down by the gullet into the second, for the œsophagus opens indifferently into both; however the creature has a power to direct it into which it will. Some tell us that the drink goes into the second, but that might be easily determined by making them drink before slaughter; the second stomach, which is the anterior and smallest, is called κεκρυφαλος reticulum, the bonnet, or king's-hood. It consists of a great number of cells on its internal surface of a regular pentagonal figure, like to a honey-comb. Here the food is farther macerated, from which it is protruded into the third, called εχινος or omasum, in vulgar language the many-plus, because the internal surface rises up into a great many plicæ or folds, and stratum super stratum, according to the length of this stomach. Some of these plicæ are further produced into the stomach than others, i. e. first two long ones on each side, and within these, two shorter in the middle, &c. There are several glands in this stomach which is next to the κοιλια in bigness, and from this it passes into the fourth, whose names are, ηνυςρον abomasum, caille, or the red, which is the name it commonly has because of its colour. Caille signifies curdled, and hence the French have given that as a name to this fourth stomach, because any milk that is taken down by young calves, from the long stay it makes here, turns acid; and by the remains of the milk before taken down assisting, it is curdled. It is this fourth stomach with the milk curdled in it, that is commonly taken for earning of milk (as they call it), but after the bile and pancreatic juice enter, this coagulation is not to be found which shews the use of these liquors. There are other animals that use the same food, that have not such a mechanism in their digestive organs; horses, asses, &c. have but one stomach where grass is macerated, and a liquor for their nourishment extracted, and the remainder sent out by the anus very little altered. From this different structure of the stomach in these creatures, a ruminant animal will be served with one third less food than another of equal bulk; graziers are sufficiently acquainted with this. The reason is, that ruminating animals have many and strong digestive organs; all their food is fully prepared and almost wholly converted into chyle, but a horse's stomach is not fitted for this, so that they require a much greater quantity of food to extract the same nourishment.

The intestines of these animals are of a considerable length in proportion to the bulk of the animal's body, and this confirms what we said formerly on the subject of the intestines of a dog, viz. that the length and capacity of the intestines were different in different animals according to the nature of their food.

This creature is provided with a loose pendulous scrotum, and consequently with vesiculæ seminales. The female organs differ from those of a bitch, mostly as to the form of the cornua uteri, which are here converted in form of a snail. In this and all uniparous animals they contain only part of the secundines, but in bitches and other multiparous animals they run straight up in the abdomen, and contain the fœtus themselves.

The situation of the heart is pretty much the same with that of a dog, only its point is rather sharper; in man the heart beating continually against the ribs, and both ventricles going equally far down to the constitution of the apex it is very obtuse, but here the apex is made up only of the left ventricle, so is more acute.

The aorta in this animal is justly divided into ascending and descending, though this division is ill founded either in a dog or man, and it has certainly been from this subject that the older anatomists took their descriptions when they made this division; for here the aorta divides into two branches answering to this character; the descending runs upwards or forwards, according to their posture, for two or three inches, before it gives off the left subclavian, and still an inch or more before the right subclavian comes off, and yet somewhat further before it divides into the two carotids, so that the vessels that go to the anterior extremity of the right side, still keep longer in a common trunk with the carotids than those on the left.

Birds.

The next class of animals we come to notice are the feathered kind; which are either granivorous or carnivorous. But before we consider the specialties in the viscera of each kind, we shall observe in what they both agree.

Fowls have a particular covering of feathers different from all other creatures, but exactly suited to their manner of life; for it not only protects them from the injuries of the weather, but serves them in their progression through that thin aerial element, they for the most part inhabit: and as some fowls live much in the water, their feathers being continually besmeared with an oily liquor, the water is prevented from soaking into their skins, and injuring them in various ways.

Fowls have the strongest muscles of their whole body inserted into their wings; whence by the way we may observe that it is altogether impossible for man to buoy himself up to the air like birds, even though he had proper machines in place of wings, unless he were likewise provided with muscles strong enough for moving them, which he has not. In the next place their wings are not placed in the middle of their bodies, but a good deal further forwards, whence it would at first view appear that their heads would be erect, and their posterior parts most depending, when raised in the air; but by stretching out their heads, which act upon the lever of a long neck, they alter in some degree their center of gravity, while by filling the sacs or bladders in the inside of their abdomen with air, and expanding their tail, they make the posterior part of their bodies considerably higher, and thus fly with their bodies nearly in an horizontal situation. Hence we find, that if their necks be kept from being stretched out, or if we cut away their tails, they become incapable of flying any considerable way. The largeness of the wings in different fowls varies according to the occasions of the creature. Thus birds of prey, who fly a considerable distance to provide their food, have large strong wings; whereas domestic birds, who find their nourishment almost every where, have very short and but small wings. The posterior extremities are so situated as to make us at first think they would be in continual hazard of falling forwards when they walk, but this is prevented by their holding up their heads and necks, and when they have occasion for climbing up a steep place, they stretch out their heads and necks forwards. Thus we may observe a goose entering a barn door, where generally there is an ascending step, stretch out its neck, which before was raised, and incline its body forwards; this is laughed at by the common people, who ascribe it to a piece of folly in the goose, as if afraid of knocking its head against the top of the door.

Carnivorous animals are provided with strong crooked claws for the catching their prey; water fowls use them for swimming, and principally for this purpose have a strong firm membrane interposed betwixt the toes. There is a beautiful mechanism to be observed in the toes of fowls which is of considerable use to them; for their toes are naturally drawn together or bended when the foot is bended; this perhaps proceeds from the duplicature of the tendons of the toes in them, which is analogous to our heels, and which, when the foot is bended, must consequently be much stretched; and since these tendons are inserted into the toes, they must of necessity bend them when the foot is bended, and when the foot is extended the flexors of the toes are again relaxed, and they are therefore expanded. This is of great use to water fowls, for without this contrivance, they must have lost as much time when they pulled their legs in, as they had gained by the former stroke; but as the parts are now framed, whenever the creature draws in its foot, the toes are at the same time bended and contracted into less space, that the resistance made against the water is not nearly so great as before: on the contrary, when they stretch their foot their toes are extended, the membrane betwixt them expanded, and consequently a greater resistance made to the water. Again, fowls that live mostly in the air, or have occasion to sustain themselves on branches of trees in windy weather, and even in the night time when asleep, while all their muscles are supposed to be in a state of relaxation, have only to lean down the weight of their bodies, and their toes continue bended without any muscles being in action: while whenever they would disentangle themselves, they raise up their bodies, by which their foot, and consequently their toes, are extended.

Carnivorous fowls have their beaks long, sharp, and crooked; the domestic fowls, such as the hen kind, &c. have strong short beaks, commodiously fitted to dig up and break their food; water fowls again have long or very broad scoop-like beaks, which is most convenient for them. The sternum of fowls is much larger proportionally than the human, and has a ridge rising in its middle for the more commodious origin of the muscles that move the wings. It is also less moveable than ours, for had it been very moveable a great deal of the force employed for moving the wings would at every contraction of the muscles have been lost, or else some other mus-

cles must have come in play to keep firm the sternum, but this additional weight would have been inconvenient for their progression.

The digestion of these animals is assisted by attrition, as is evinced by many experiments. We see them daily take down considerable numbers of the most solid rugged little flints they find, and these can serve for no other purpose than to help the trituration of their aliments. After these pebbles by becoming smooth are unfit for this office, they are thrown up by the mouth; hence fowls that are long confined, though never so well fed, turn lean for want of such stones to help their digestion; but this was put beyond all dispute by Mr. Tauvry, who gave a species of metal to an ostrich, convex on one side, and concave on the other, but carved on both; and opening the creature's body some time after, it was found that the carving on the convex side was all obliterated, while the engraved character remained the same as before on the concave side, which was not subjected to the stomach's pressure; which could not have happened had the obliteration been produced by gastric juice or any other menstruum whatever, since in this case both sides of the metallic plate would have been affected alike.

The pancreas in birds, and we shall chiefly confine ourselves in this description to the cock, lies betwixt the two folds of the duodenum, and sends two or three ducts into this gut pretty near the biliary.

The spleen is of a round globular figure, situated between the liver and stomach, and betwixt these and the back bone it enjoys the same kinds of vessels as other animals. All its blood is sent into the vena portarum, and has a perpetual conquassation. It has no excretory that we know of. Their liver is divided into two equal lobes by a pellucid membrane, running according to the length of their body; and hence we may observe, that it is not proper to that bowel to lie on the right side, which is still more confirmed by what we observe in fishes where the greater part of it lies in the left side.

The shape of their gall-bladder is not very different from that of quadrupeds, but is thought to be longer in proportion to the size of the animal, and is farther removed from the liver; though in fishes it is removed still further, and not at all contiguous; and in them the ductus hepaticus and cysticus do not unite till just at the entry into the gut. In them also there seems to be no way for the bile to get into the gall-bladder but by regurgitation.

The principal difference to be remarked in their heart is the want of the valvulæ tricuspides, and their place being supplied by one fleshy flap.

The lungs are not loose within the cavity of the thorax, but fixed to the bone all the way; neither are they divided into lobes, as in those animals that have a large motion in their spine. They are two red spongy bodies covered with a membrane that is pervious, and which communicates with the large vesicles or air bags that are dispersed over their whole abdomen, which vesicles serve two very considerable uses; the one is to render their bodies specifically light, when they have a desire to ascend, and buoy them up when flying, by distending their lungs with air, and contracting their trachea arteria, and hence returning the air.

The other use of these air vesicles is to supply the place of a muscular diaphragm and strong abdominal muscles; producing the same effects on the several contained viscera, as these muscles would have done without the inconveniency of their additional weight; and conducing as much to the exclusion of the egg and fæces.

The trachea arteria, near where it divides, is very much contracted, and their voice is principally owing to this coarction. If you listen attentively to a cock crowing, you will be sensible that the noise does not proceed from the throat, but deeper; nay this very pipe, when taken out of the body and cut off a little after its division, and blown into, will make a squeaking noise, something like the crowing of a cock. On each side, a little higher than this contraction, there is a muscle arising from their sternum, which dilates the trachea. The cartilages, of which the pipe is composed in this animal, go quite round it; whereas in men and in quadrupeds, they are discontinued for about one fourth on the back part, and the intermediate space filled up by a membrane. Neither is the trachea so firmly attached to their vertebræ as in other animals.

In place of a muscular diaphragm, this animal has nothing but a thin membrane connected to the pericardium, which separates the thorax and abdomen. But besides this, the whole abdomen and thorax are divided by a longitudinal membrane or mediastinum connected to the lungs, pericardium, liver, stomach, and to the fat lying over their stomach and intestines, which is analogous to an omentum, and supplies its place.

The kidneys lie in the hollow excavated in the side of the back-bone, from which there is sent out a blueish coloured canal, running along by the side of the vas deferens, and terminating directly in the rectum. This is the ureter, which opens by a peculiar aperture of its own, and not at the penis. As the bird has no vesica urinaria, it was formerly thought that he never passed any urine, but that it went to the nourishment of the feathers; that whitish substance, however, with which you see their greenish fæces covered, and which turns afterwards chalky, is their urine. For like the horse, and many other quadrupeds, birds also secrete lime from their kidneys.

The testicles are situated one on each side of the male back-bone, and are proportionally very large, and especially in the cock, to the creature's bulk. From these run out the vasa seminifera, at first straight, but afterwards receding from the body of the testicle, and acquiring an undulated or convoluted form, as the epididymis in man. These convolutions partly supply the want of vesiculæ seminales, and terminate in the penis, of which this creature has two, or rather one bifid penis, with a prominence or corpus cavernosum on each side of the common canal, pointing directly outwards, very small and very short, hardly so large as a millet seed; whence they have escaped the notice of anatomists, who have often denied their existence.

In the female the racemus vitellorum, analogous to the ovaria in the human subject, is attached by a proper membrane to the back-bone. This is very fine and thin, and continued down to the uterus. Its orifice is averse with respect to the ovaria, yet notwithstanding, by the force of the venereal orgasm, it turns round and grasps the vitellus, which in its passage through this duct, called the infundibulum, receives a thick gelatinous liquor, secreted by certain glands. This, with what it receives in the uterus, compose the

white of the egg. By this tube it is carried into the uterus.

The uterus is a large bag, placed at the end of the infundibulum, full of wrinkles on its inside; here the egg is completed, receiving its last involucre, and the shell is at last pushed out at an opening in the side of the common canal. From the testes in the male being so very large, in proportion to the body of the creature, there must necessarily be a great quantity of semen secerned; hence the animal is salacious, and becomes capable of impregnating many females. The want of the vesiculæ seminales is in some measure supplied by the convolutions of the vasa deferentia, and by the small distance betwixt the secerning and excretory organs. The two penes contribute also very much to their short coition, at which time the opening of the uterus into the rectum is very much dilated, that the effect of the semen on the vitelli may be the greater.

A hen will of herself indeed lay eggs, but these are not impregnated, and yet appear entirely complete, except that the small black spot, which proves afterwards to be the rudiments of the chick, is not here to be observed.

Fowls in general have no teeth, which would be needless, as they swallow their food entire; but their tongue is made pretty firm, lest it should be hurt by the sharp points of the grain they feed on. It is of a triangular figure, and pointed before; and as by the depending posture their meat is in hazard of falling out of their mouths; to prevent this, there are several small pointed papillæ standing out upon their tongue and palate, with recurvated points, which allow an easy passage to the food, but hinder its return.

We have here no velum palatinum, uvula or epiglottis, and in place of two large apertures opening into the nose, there is only one long narrow cavity supplied with pretty strong muscles, while another supplies the place of a glottis. The bird has a power of shutting both at pleasure, and while the nature of his food seems to exempt him from the hazard of its getting into the nose or trachea, the sharp points of the food would hurt an uvula, or epiglottis, if he possessed any. Hence we see with what difficulty birds swallow dough or other sort of food that can be easily moulded into any form.

Their cranium is more cellular and cavernous than ours; by this means their heads are light, yet strong enough to resist external injuries; for an enlargement of the diameter of the bones contributes to their strength. By this cavernons cranium the organ of smelling is considerably enlarged; while singing birds have this cavernous structure of the brain still more observable. Their brain is covered with the common membranes, but its external surface is not formed into so many gyrœ or convolutions, as ours. Its anterior part is quite solid, of a cineritious colour, and so far has a resemblance of the corpora striata, as to give rise to the olfactory nerves. The whole of it appears to us as imperfect, and we can scarcely determine whether there be any thing analogous to a third or fourth ventricle; neither the corpus callosum, fornix, nates, or testes, &c. can be observed here; which parts therefore cannot be imagined as absolutely necessary for the functions of life, since we find these creatures perform them sufficiently well.

Their organ of smelling is very large and well provided with nerves; hence they have this sensation very acute. Ravens and other birds of prey give a sure proof of this by their being able to find out ravine though concealed from their sight, and at a considerable distance.

Birds that grope for food in waters, mud, &c. have large nerves which run quite to the end of their bills, by which they discern and distinguish it with great exactness.

The anterior part of their eyes (instead of having the sclerotic coat continued, so as to make near a sphere as in us) turns all of a sudden flat; so that here the sclerotic makes but half a sphere; while the cornea rises up afterwards, being a portion of a very small and distinct sphere; so that in these animals there is a much greater difference betwixt the sclerotic and cornea than in us. Hence their eyes do not jut out of their heads as in man and quadrupeds. As most birds are continually employed in hedges and thickets, that their eyes may be secured from injuries, as well as from too much light when flying in the face of the sun, they are provided with a very elegant mechanism consisting of a membrane rising from the internal canthus of the eye, which at pleasure can be made, like a curtain, to cover the whole eye, and this by means of a proper muscle that rises from the sclerotic coat and passing round the optic nerves runs through the musculus oculi attollens and palpebra to be inserted into the edge of this membrane. This covering is neither pellucid nor opaque, both which would have been equally inconvenient, but being somewhat transparent, allows as many rays to enter as to make any object just visible, and to direct them in their progression. By means of this membrane the eagle is said to look at the sun. Quadrupeds, as we mentioned before, have a membrana nictitans; but then it can only cover that part of the eye which is never covered by their eye-lids.

All fowls moreover have another particularity, the use of which is not well understood, and that is a pretty long black triangular purse rising from the bottom of the eye just at the entrance of the optic nerve, and stretched out into the vitreous humour, appearing to give some threads to the crystalline. To this the French have given the name of bourse noire. It may possibly serve to suffocate some of the rays of light, that birds may see objects more distinctly without hurting their eyes. It has a connection with the vitreous, and seems to be joined also to the crystalline humour.

They have no external ear, but in place thereof a tuft of very fine feathers covering the meatus auditorius, which easily allows the rays of sound to pass through, and prevent dust or insects from getting in. An external ear would have been inconvenient in their passing through thickets and in flying, &c. A liquor is separated in the external part of the ear or meatus auditorius to lubricate the passage, and still further prevent the entrance of insects, &c. The membrana tympani is convex externally, and no muscles are fixed to the bones of their ear, which are rather of a cartilaginous consistence; any tremulous motions impressed on the air are communicated in these animals, merely by the spring and elasticity of these bones, whence it is perhaps that the membrane is not so distended as in the human ear, where this is effected by muscles. The cochlea and semicircular canals are very distinct and easily prepared.

Carnivorous birds, or those of prey, chiefly differ from granivorous in their chylopoietic viscera, which may be accounted for from their dif-

ferent mode of life. We shall select the osprey (falco ossifragus of Linnéus) as an instance.

Immediately under their clavicles the œsophagus expands into their ingluvies, which is proportionally less than in the granivorous kind, since their food does not swell so much by maceration, and for the same reason, there is a less quantity of menstruum to be found here.

They have also a ventriculus succenturiatus plentifully stored with glands, situated immediately above their stomach, which is evidently membranous, hence differing considerably from the granivorous kind, and constituting almost the chief difference that subsists between the two families of fowls: a difference, moreover, easily accounted for in regard to the carnivorous kind from the nature of their food, which requires less attrition, as being easier of digestion than that of the other kind.

Amphibials.

These, though aquatic animals, possess lungs, and differ so inconsiderably from quadrupeds that a few observations upon the more singular of the class will suffice to point out every prominent peculiarity in their structure.

Tortoise.—This animal is covered by a shell so hard and firm in its texture as to bear the weight of a loaded waggon without injury. This shell progressively increases in size according to the growth of the animal, and is hence never cast like the shells of many testaceous and crustaceous tribes. To admit growth with more facility it is composed of imbricate layers more or less distinct. The feet are small and weak, and exceedingly slow in walking.

The tortoise is tongueless and toothless: but these organs are supplied by the hardness of its lips, which are able to crash substances the most firm.

The chief difference is in the circulation of the blood. The heart has two auricles without any communication; under which are two ventricles as they are commonly called, but which may rather be regarded as one cavity; for from this cavity proceeds not only the pulmonary artery but the aorta, while a passage through an imperfect septum allows them to communicate freely. From the aorta the blood returns to the right auricle, from the pulmonary artery to the left, being thence sent into what is called the left ventricle; so that only a part of the blood is transmitted to the lungs, the rest proceeding immediately to the aorta: whence amphibials are not compelled to breathe so frequently as they otherwise would be. The blood-vessels differ not essentially from those of quadrupeds in general; and the lacteals are chiefly remarkable for terminating in two thoracic ducts, one on each side of the spine, which nevertheless unite at length and terminate in the common way.

The lacerta, serpent, and frog tribes have but one auricle and ventricle: in other respects the organization resembles that of the tortoise.

Fishes.

Of these we may first remark, that they have a very strong thick cuticle, composed evidently of a great number of scales, laid one over another like the tiles of houses; this, among other arguments, serves to prove the human epidermis to be of a squamous structure. In the next place these animals have neither anterior nor posterior extremities, as quadrupeds and birds: their progression being performed in a different way by machines properly consisting of a great number of elastic layers, connected to one another by firm membranes, and with a tail of the same texture; their spine is very moveable towards the posterior part, into which the strongest muscles of their bodies are inserted. Their tails are so framed as to contract to a narrow space when drawn together to either side, and to expand again when drawn to a straight line with their bodies; whence, by the assistance of this broad tail, and the fins on their sides, they advance much in the same way as a boat with oars on its sides and rudder at its stern. The perpendicular fins situated on the superior part of their body keeping them in equilibrium, and hindering the belly from turning uppermost, which it would readily do from the air bag in the abdomen, which renders the belly specifically lighter than the back, were it not for this mechanism and the resistance these fins meet with when inclined to either side.

It may be next observed, that fishes neither have nor want any thing that can be called a neck, since they seek their food in an horizontal way, and can move their bodies either upwards or downwards as they have occasion, by the contraction or dilatation of their air bag; a long neck indeed, as it would impede their progress, would be very disadvantageous in the element they live in.

The abdomen is covered on the inferior part with a black-coloured thin membrane resembling our peritoneum. It is divided from the thorax by a thin membranous partition which has no muscular appearance; so that we have now seen two different sorts of animals that have no muscular diaphragm.

Fishes are not provided with grinding teeth, or those proper for breaking their aliment into smaller morsels, as the food they use is generally small fishes, or other animals, that need no trituration in the mouth, but which spontaneously corrupt and gradually dissolve into a liquid chyle. The teeth of fishes serve to grasp their prey, and hinder it when once caught from escaping. For the same purpose, the internal cartilaginous basis of the bronchi, and the two round bodies situated in the posterior part of the jaws, have a great number of tenter-hooks fixed into them in such a manner, as that any thing may easily pass forwards, but is prevented from returning. The water that is necessarily taken in along with their food in too great quantities to be received into their jaws in deglutition, passes betwixt the interstices of the bronchi, and the flap that covers them. The compression of the water on the bronchi is of considerable use to the animal, as we shall explain presently.

The œsophagus is very short, and scarcely distinguishable from the stomach, whence their food lies almost equally in both. The stomach is of an oblong figure. There are commonly found small fishes in the stomach of large ones, still retaining their natural form, but when touched melting into a jelly. From this and the great quantity of fluids poured into their stomachs, we may conclude that digestion is solely brought about in them by the dissolving power of the gastric juice, and that no trituration happens here, as in granivorous birds.

The intestines in these animals are very short, making only three turns, the last of which ends in the common canal for the fæces, urine and semen, situated about the middle of the inferior part of their bodies. Their intestines are con-

nected to the back bone by a membrane analogous to a mesentery.

The liver is very large, of a whitish colour, lies almost wholly in the left side, and contains a great deal of fat, called blubber.

The gall bladder is situated a considerable way from the liver, and sends out a canal, the cystic duct, which joins the hepatic duct just at the entrance into the intestine; some fibres stretch from the liver to the gall-bladder, but they have never been discovered to be tubular: whence in this animal it should seem impossible that the bile can be carried into the gall-bladder in the ordinary way, and, consequently, must either be secerned on the sides of that sac, or regurgitate into it from the canalis choledochus.

The spleen is placed near the back-bone, and is subject to an alternate pressure from the constriction and dilatation of the air-bag, situated in the neighbourhood. Since in all the different animals we have dissected, we find the spleen attached to somewhat that may give it a conquassation, being in the human subject and quadrupeds contiguous to the diaphragm, in fowls placed betwixt the back-bone, the liver and stomach, in fishes lying on the air-bag; and since again we find it so well served with blood-vessels, and all its blood returning into the liver, we must not conclude the spleen to be a useless organ, merely serving as a balance to the animal, but particularly designed for preparing the blood for the liver.

The only organs of generation in this animal are two large bags situated in the abdomen uniting near the podex. These in the male are filled with a whitish firm substance called the milt, and in the female with an infinite number of little ova clustered together, of a reddish yellow colour, called the roe. Both these at spawning time we find very much distended, while at other times the male organs can scarcely be distinguished from the female; nor is there any proper instrument in the male for throwing the seed into the organs of the female, as in most other creatures. It is hence uncertain by what mode the female sperm is impregnated.

The spawn of frogs consists in small specks wrapt up in a whitish glutinous liquor; which specks are the rudiments of the young frogs which are nourished in that liquor, till they are able to search after their food. In the same way the ova of fishes are perhaps thrown out and deposited in the sand, the male being for the most part ready to impregnate them, after which they are incubated by the heat of the sun. It is curious to remark with what care the females seek for a proper place to deposit their ova, by swimming to the shallow, where they can better enjoy the sun's rays, and shun the large jaws of other fishes. River fishes again spawn in some creek free from the hazard of the impetuous stream. But whether the mixture of the sexual fluids be brought about in fishes by a simple application of the genitals to each other, or whether both sexes throw out their liquors at the same time in one place, and thus bring about the desired combination, it is not easy to determine; the latter seems most probable. Fishes are in general so shy that we cannot possibly get to observe their way of copulation, and are consequently but little acquainted with their natural history.

After raising up the black peritoneum, we meet with an oblong white membranous bag, in which is nothing but air. This is the swimming-bladder; it lies close to the back-bone, and has a pretty strong muscular coat, whereby it can contract itself. By contracting this bag, fishes can make the muscles specifically heavier than water, and so readily fall to the bottom; on the contrary, when the muscular fibres cease to act, they become specifically lighter than water, and so swim above. According to the different degrees of contraction and dilatation of this bladder, they can keep higher or lower in the water at pleasure. Hence flounders, soles, rays, and such other fishes as want this sac, are found always groveling at the bottom of the water: it is owing to this that dead fishes (unless this membrane have been previously broken) are found swimming at top, and that with their bellies uppermost, the muscular fibres then ceasing to act; for the back-bone cannot yield, the distended sac is protruded into the abdomen, and the back is consequently heaviest at its upper part according to their posture. There is here placed a glandular substance containing a large quantity of red blood, and indeed all the red in their body is contiguous to this air-bag, excepting the intestines.

At the superior part of this bag there are other red coloured bodies, of a glandular nature, connected with the kidneys. From them the ureters descend to their insertion in the vesica urinaria, which lies in the lower part of the abdomen, and here the urethra commences, which terminates in the vent.

The heart is of a triangular form, with its base downwards, and its apex uppermost, which situation it has because of the branchiæ. It has but one auricle and one ventricle, because they want lungs; and one great artery. The size of the auricle and ventricle are much the same; the artery sends out numberless branches to the branchiæ or gills.

The branchiæ lie in two large apertures at each side of their heads, and answer all the purposes of lungs. Their form is semicircular; they have a vast number of red fibrillæ standing out on each side of them, like a fringe, and very much resemble the vane of a feather. These branchiæ are perpetually subject to an alternate motion and pressure from the water: and we may here remark, that we have not found any red blood but in places subject to this alternate pressure; an observation which will help us in explaining the action of the lungs upon the blood. Over these gills there is a large flap allowing a communication externally, by which the water they are obliged to take into their mouths with their food finds an exit without passing into their stomach; it is owing to these flaps coming so far down that the heart is said commonly to be situated in their heads.

The brain of fishes is formed pretty much in the same way as that of fowls, only we may observe that the posterior lobes bear a greater proportion to the anterior.

The organ of smelling is large, and they have a power of contracting and dilating the entrance into the nose as they have occasion. It seems to be mostly by their acute smell that they discover their food; for their tongue does not appear to have been designed for a very nice sensation, being of a pretty firm cartilaginous substance, and common experiment evinces that their sight is of much less use to them than their smell. If you throw a fresh worm into the water, a fish shall distinguish it at a considerable distance; and that this is not done by the eye is plain, from observing, that after the same worm has been a considerable time in the

water and lost its smell, no fish will come near it; but if you take out the bait and make several little incisions into it, so as to let out more of the odoriferous effluvia, it shall have the same effect as formerly.

The optic nerves in these animals are not confounded with one another in their middle progress betwixt their origin and the orbit, the one passing over the other without any communication, so that the nerve that comes from the left side of the brain goes distinctly to the right-eye: and vice versa.

The crystalline lens is here a complete sphere, while in man and all other terrestrial animals it consists of two portions of unequal spheres laid on over one another; to account for this difference, it must be considered that fishes have got no aqueous humour, as the rays that come to their eyes are conveyed through a medium of the same density with that humour in other animals, and consequently would have gone on in a straight line without any refraction till they reach the lens, although they had been provided with an aqueous humour; thus then the rays impinging upon their lens have hitherto suffered no refraction; that they might therefore be sufficiently refracted and meet in a point on the retina, it was necessary the lens should be made more convex than it is in other creatures who have the rays considerably refracted in their passage from the air through the aqueous humour.

As fishes are continually exposed to injuries in the uncertain element they live in, and as the smaller are in perpetual danger of becoming a prey to the larger, it is necessary their eyes should never be shut, and in consequence of this they are not provided with palpebræ; but then as in the current itself the eye must be exposed to several injuries, it is also necessary it should be sufficiently defended, which in effect it is by a firm pellucid membrane that seems to be a continuation of the cuticle.

It was formerly doubted whether fishes possessed an organ of hearing: experiment, however, and even anatomical research have concurred of late years in perfectly removing this doubt. Almost all fishes are now well known to fly away in apparent agitation upon our firing a gun, or making any other great noise on the bank of the stream they inhabit, although they see neither the person who fires it nor the flame issuing from it; and carp are in many places regularly called to their meals by ringing a bell for this purpose. Zootomy, moreover, has detected the existence of an organ subservient to this sense, at least the existence of that gelatinous pulp which is found constantly existing in the auditory labyrinth of all the higher and most of the lower orders, from man down to the sepia or cuttle-fish, which is covered by a fine elastic membrane, and in which the last ramifications of the auditory nerve are lost. The membrane inclosing the auditory pulp, however, is always finer and weaker than in quadrupeds. In the cray-fish it scarcely deserves the name of labyrinth. In the cuttle-fish it is nearly as simple, and merely consists of an oval or roundish purse. In the pulp is suspended a small osseous body. In fishes with free branchiæ it is more complicate, the labyrinth consisting of three semicircular canals; and the pulp contains two or three small bones according to the species. In osseous fishes these bones are as hard as stone, and are suspended in the midst of the pulp by a great number of nervous fibrillæ. In fishes with fixed branchiæ the organ does not essentially vary.

Insects and Worms.

The greater part of the more perfect of these, so far as they have been examined, are found to contain a sensorium, a thorax, and abdomen, though each of these organs differs in most genera, as well in position as in form. The rest have commonly a single cavity with a single sensorial line running through it.

The brain of the eight-armed sepia is inclosed in a particular cavity of the cartilage of the head, which is pierced by a variety of apertures to give passage to the nerves. In the snail it is situated upon the œsophagus, behind an oval mass of muscles which envelopes the mouth and pharynx. All the nerves proceed from this muscular mass. In the slug it is not essentially different.

In all the testaceous acephala, from the oyster to the pholas and teredo, there appears no remarkable variety: the brain always consisting of two ganglia, one on the mouth, and another towards the opposite end. These two ganglia are united by two long nervous cords, and from them all the nerves arise.

In the cancer tribe the brain is placed at the anterior extremity of the snout, and consequently at a considerable distance from the mouth, which opens under the corselet. The medullary cord which arises from it, is considerably more bulky than the brain itself. The brain and medulla give forth six nerves on each side to the jaws and feet, and one which proceeds to the tail.

The brain of insects whether in their larva or perfect state, is generally placed immediately above the origin of the oesophagus, and when maturely entomized, it consists sometimes of two lobes, as in the nepa cinerea (water scorpion), and sometimes of four, as in the common honey-bee.

In the asteria, holothuria, echinus marinus, hydra, medusa, and a few others, we have not been able to ascertain a nervous system of any kind.

The structure of the eye in many insects is peculiarly curious. The outer part is remarkably hard, to guard against injuries. In some the eye is simple, in others compound, or may be regarded as an assemblage of smaller eyes.

The head is united to the thorax either by a solid junction, or an articulation which is ligamentous; the thorax is situated between the breast and head; the first pair of feet are usually joined to this part: the breast is therefore the third articulation, the portion of which, towards the back, is called the scutel or escutcheon. This last, however, is wanting in the lepidoptera. The breast contains the muscles that move the wings, as the chest does those that move the head; it contains also the muscles that move the four posterior feet. The abdomen is the fourth and last division of the trunk; it commonly consists of several rings, the number of which is very variable. Sometimes it is sessile, that is, fixed so close to the breast that it seems a continuation of it, as in most of the coleoptera. The number and general form of the feet vary, and depend upon the insect's peculiar mode of life.

The organs of motion in worms are less perfect than in insects. Having neither scaly nor membranous feet, several kinds crawl or drag themselves along by the help of stiff hairs or bristles, with which they are either wholly or partly covered, as the terebella, nereis, lumbricus: others, destitute of these integuments, advance by the help of the two extremities of the body, which they apply alternately to the surface on which they crawl. Such are leeches and intestinal worms.

The moving powers of such zoophytes as are locomotive it is very difficult to ascertain, and often on account of their transparency. Some few possess retractile feet in the form of suckers filled with a fluid, and move by withdrawing their feet or suckers and occasioning the fluid to change its place. The mouths of many of them are furnished with tentacles, which are moveable at the will of the animal, and with which it seizes its prey. The medusa swims by displacing the water with alternate motions, which renders its body alternately flat, and convex. The coriaceous skin which covers the achinia, possesses so extraordinary a power of contraction, that these animals can assume the most dissimilar forms at pleasure. Sometimes they are flattened into a dish; sometimes elevated into a cone, sometimes lengthened into a cylinder. In the hydra, we find only a few moveable tentacles. In the vorticella and the rotifer, by the help of instruments, we can discern a few cilia of different figures, turning round their axis with astonishing rapidity.

For the bones, muscles, vessels, and organs of man, see Anatomy, Pl. X. to Pl. XIV. For those of the more curious or useful animals of inferior classes or orders, see Comparative Anatomy, Pl. LXI. to Pl. LXVIII.

COMPA'RATIVELY. *ad.* (from *comparative.*) In a state of comparison; according to estimate made by comparison (*Rogers*).

To COMPA'RE. *v. n.* (*comparo*, Latin.) 1. To make one thing the measure of another; to estimate the relative proportion of any quality (*Tillotson*). 2. To get; to procure; to obtain (*Spenser*).

COMPA'RE. *s.* (from the verb.) 1. Comparative estimate; comparison (*Suckling*). 1. Simile; similitude (*Shakspeare*).

COMPA'RISON. *s.* (*comparaison*, Fr.) 1. The act of comparing (*Grew*). 2. The state of being compared (*Locke*). 3. A comparative estimate (*Tillotson*). 4. A simile in writing or speaking (*Shakspeare*). 5. (In grammar.) The formation of an adjective through its various degrees of signification: as, *strong, stronger, strongest.*

COMPARISON OF IDEAS, among logicians, that operation of the mind whereby it compares its ideas one with another, in regard of extent, degree, time, place, or any other circumstance, and is the ground of relations. This is a faculty which the brutes seem not to have in any great degree.

COMPARISON, in rhetoric, a figure that illustrates and sets off one thing, by resembling and comparing it with another, to which it bears a manifest relation and resemblance, as the following figure in Shakspeare:

"She never told her love,
But let concealment, like a worm i' the bud,
Feed on her damask cheek: she pined in thought,
And sat like Patience on a monument,
Smiling at Grief."

Or this, from Dr. Young's Revenge:

"The maid that loves
Goes out to sea upon a shatter'd plank,
And puts her trust in miracles for safety."

To COMPA'RT. *v. a.* (*compartir*, French.) To divide; to mark out a general design into its various parts or subdivisions (*Wotton*).

COMPARTITION, in architecture, the useful and the graceful disposition of the whole ground-plot of an edifice, into rooms of office, of reception or entertainment.

COMPARTMENT, or COMPARTIMENT, in general, a design composed of several different figures, disposed with symmetry, to adorn a parterre, a cieling, &c.

A compartment of tiles, or bricks, is an arrangement of them, of different colours, and varnished for the decoration of a building. Compartments, in gardening, are an assemblage of beds, plats, borders, walks, &c. disposed in the most advantageous manner that the ground will admit of. Compartments, in heraldry, are otherwise called partitions. See PARTITION.

To CO'MPASS. *v. a.* (*compasser*, French.) 1. To encircle; to environ; to surround (*Job*). 2. To walk round any thing (*Dryden*). 3. To beleaguer; to besiege (*Luke*). 4. To grasp; to enclose in the arms. 5. To obtain; to procure; to attain (*Pope*). 6. To take measures preparatory to any thing; as, *to* compass *the death of the king.*

CO'MPASS. *s.* (from the verb.) 1. Circle; round (*Shakspeare*). 2. Extent; reach; grasp (*South*). 3. Space; room; limits (*Atterbury*). 4. Enclosure; circumference (*Milton*). 5. A departure from the right line; an indirect advance. 6. Moderate space; moderation; due limits (*Davies*). 7. The power of the voice to express the notes of musick (*Dryden*).

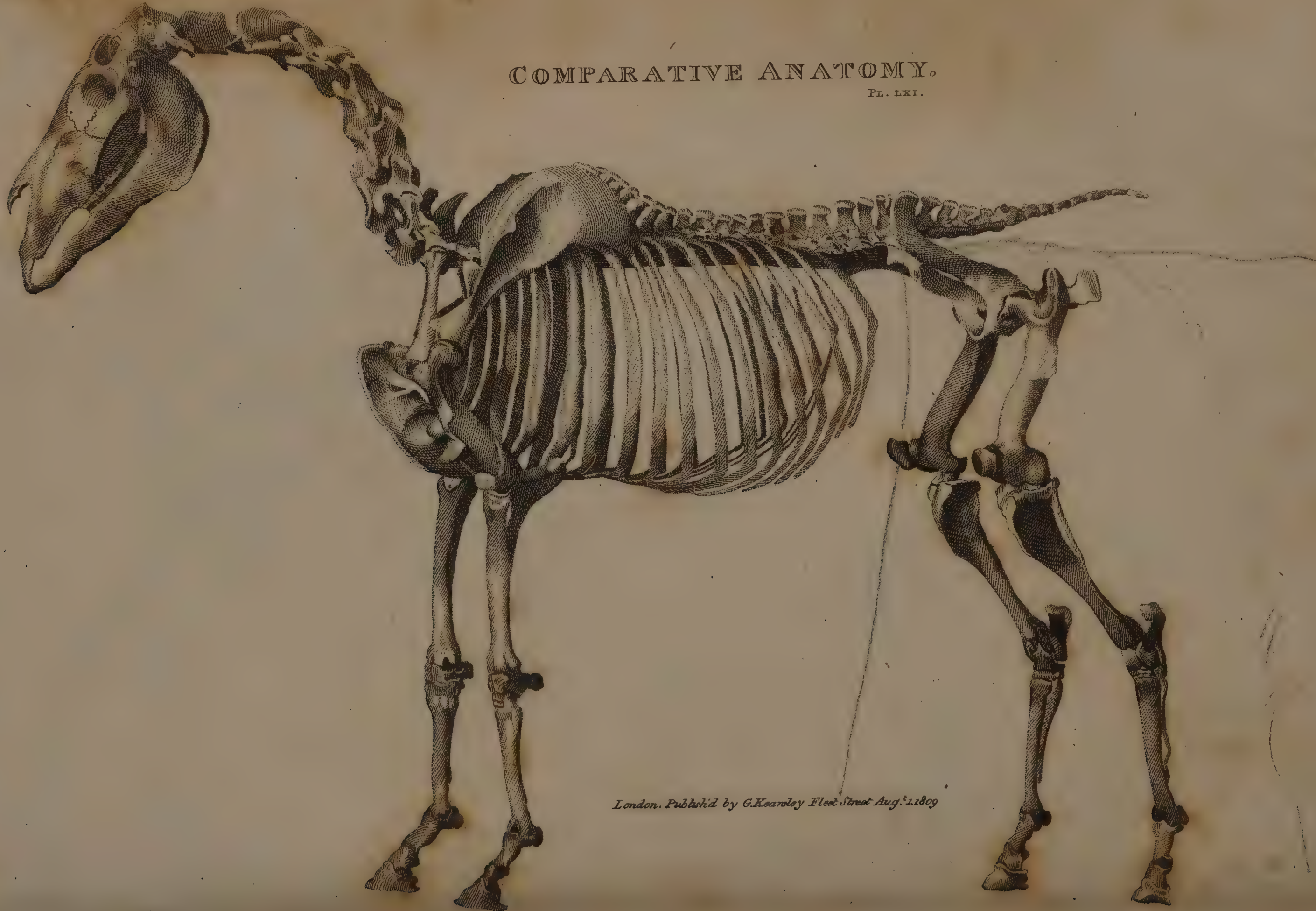
COMPASS, or MARINER'S STEERING COMPASS, is an instrument used at sea by pilots to direct and ascertain the course of their ships. It consists of a circular brass box, which contains a paper card with the 32 points of the compass, fixed on a magnetic needle that always turns to the north, excepting a small declination variable at different places. (See VARIATION.) The needle with the card turns on an upright pin fixed in the centre of the box. In the centre of the needle is fixed a brass conical socket or cap, whereby the card hanging on the pin turns freely round the centre. The top of the box is covered with a glass, that the card's motion may not be disturbed by the wind. The whole is enclosed in another box of wood, where it is suspended by brass hoops or gimbals, to preserve the card horizontal. The compass-box is to be so placed in the ship, that the middle section of the box, parallel to its sides, may be parallel to the middle section of the ship along its keel.

The compass being of the utmost consequence to navigation, it is reasonable to expect that the greatest attention should be used in its construction, and every attempt to improve it carefully examined, and, if proper, adopted.

The very great objections to which the common compass is obnoxious, induced the ingenious Dr. Knight to contrive a new one, which is now in use on board all our ships of war. The needle in this instrument is quite

COMPARATIVE ANATOMY.

PL. LXI.

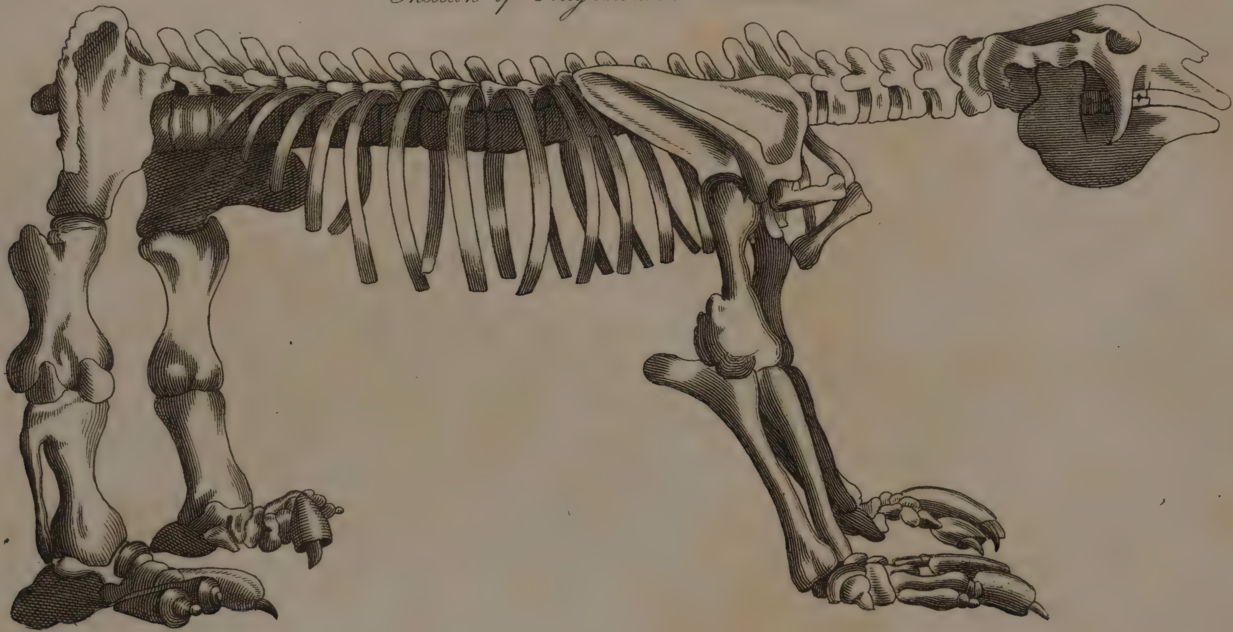


London. Publish'd by G.Kearsley Fleet Street Aug.t 1.1809

COMPARATIVE ANATOMY.

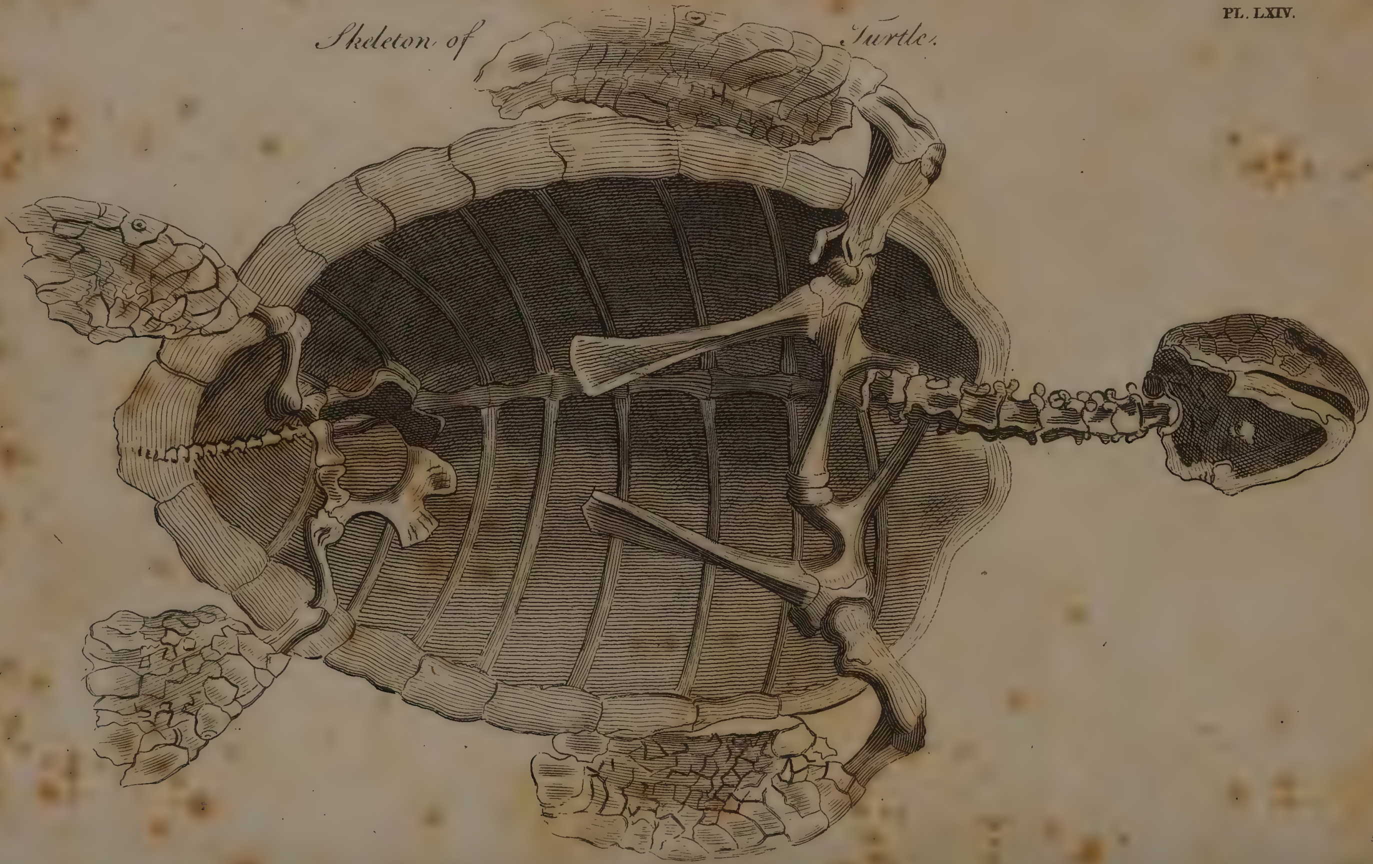
PL. LXIII.

Skeleton of Megatherium Americanum.



London, Published by G. Kearsley, Fleet Street, April 1st 1809.

Mutlow. fc.



Skeleton of Turtle.

London Published by G. Kearsley Fleet Street April 1st 1809.

COMPARATIVE ANATOMY.

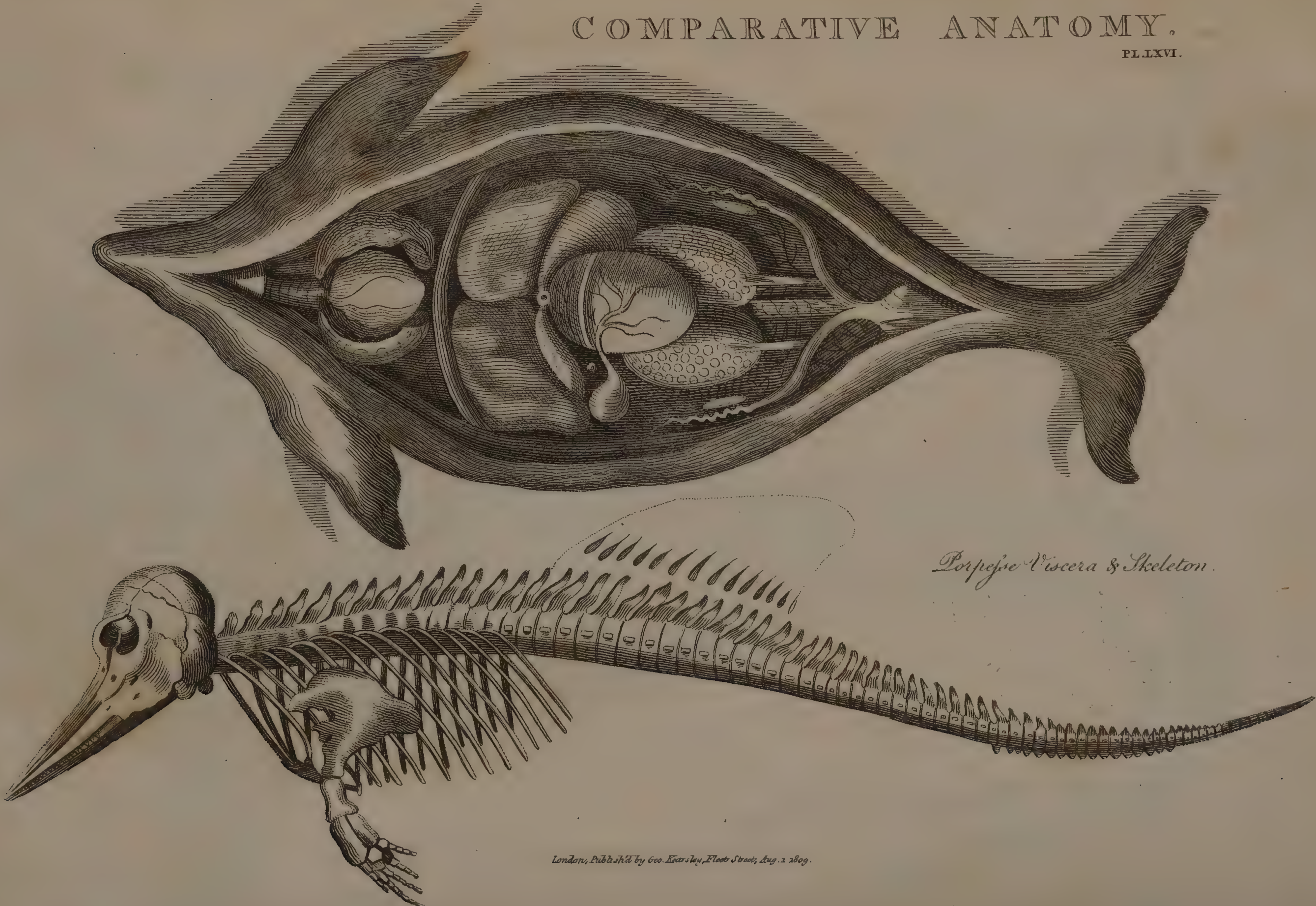
PL. LXV.

Skeleton of Frog.

Skeleton of Viscera.

Drawn from Life by S. Edwards.

London, Publish'd by Geo. Kearsley, Fleet Street Feb. 1. 1809.

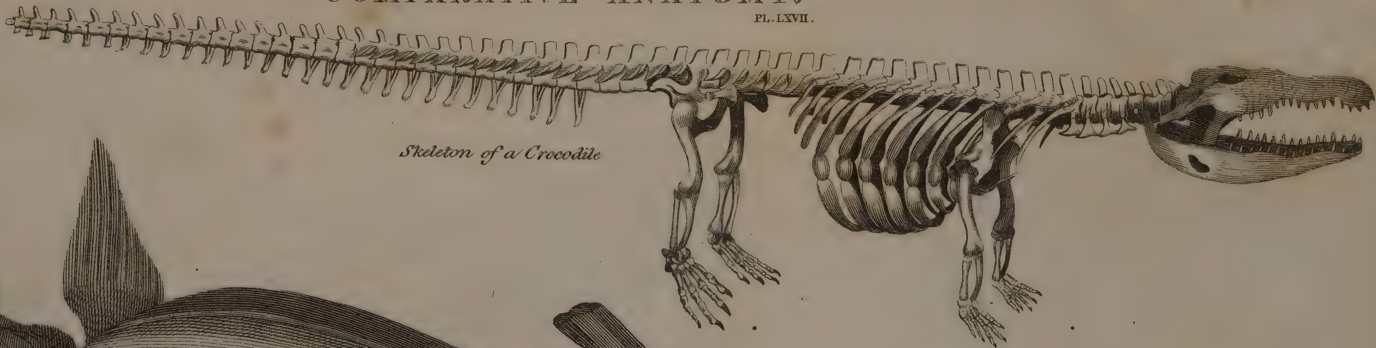


Porpesse Viscera & Skeleton.

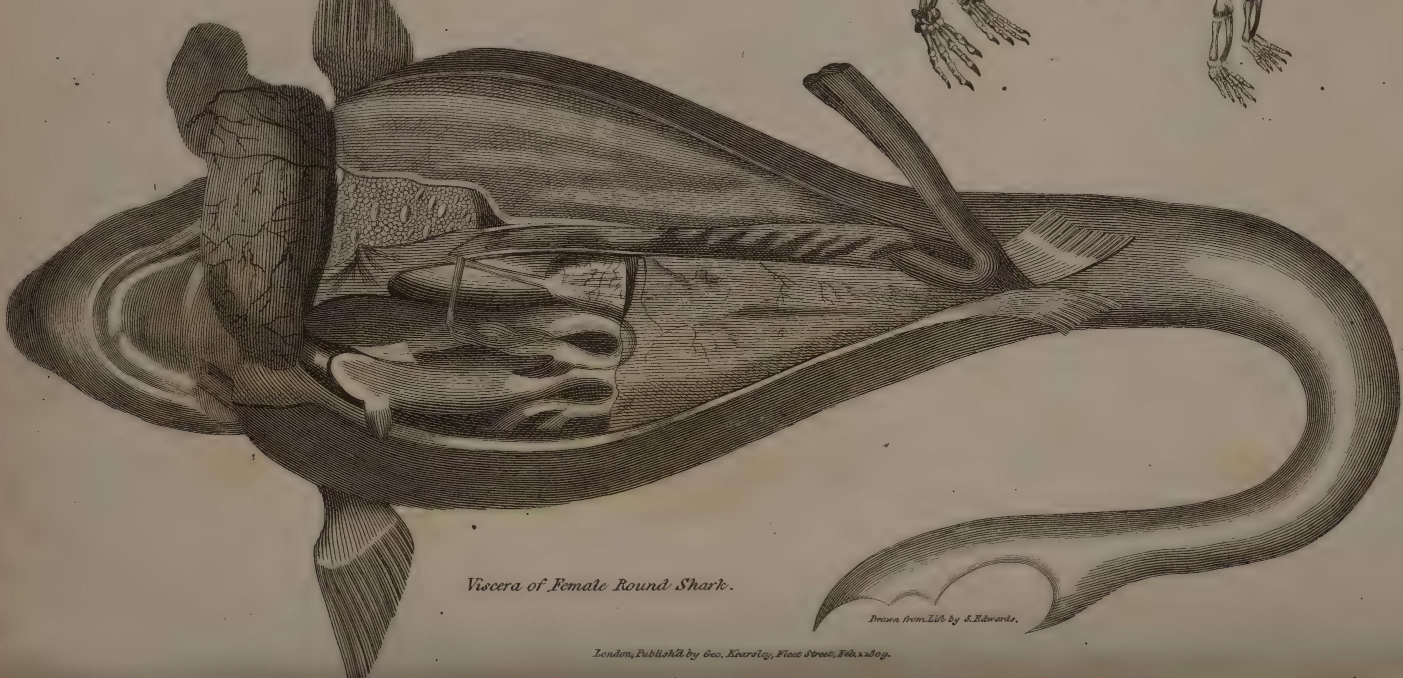
London, Publish'd by Geo. Kearsley, Fleet Street, Aug. 1 1809.

COMPARATIVE ANATOMY.

PL. LXVII.



Skeleton of a Crocodile



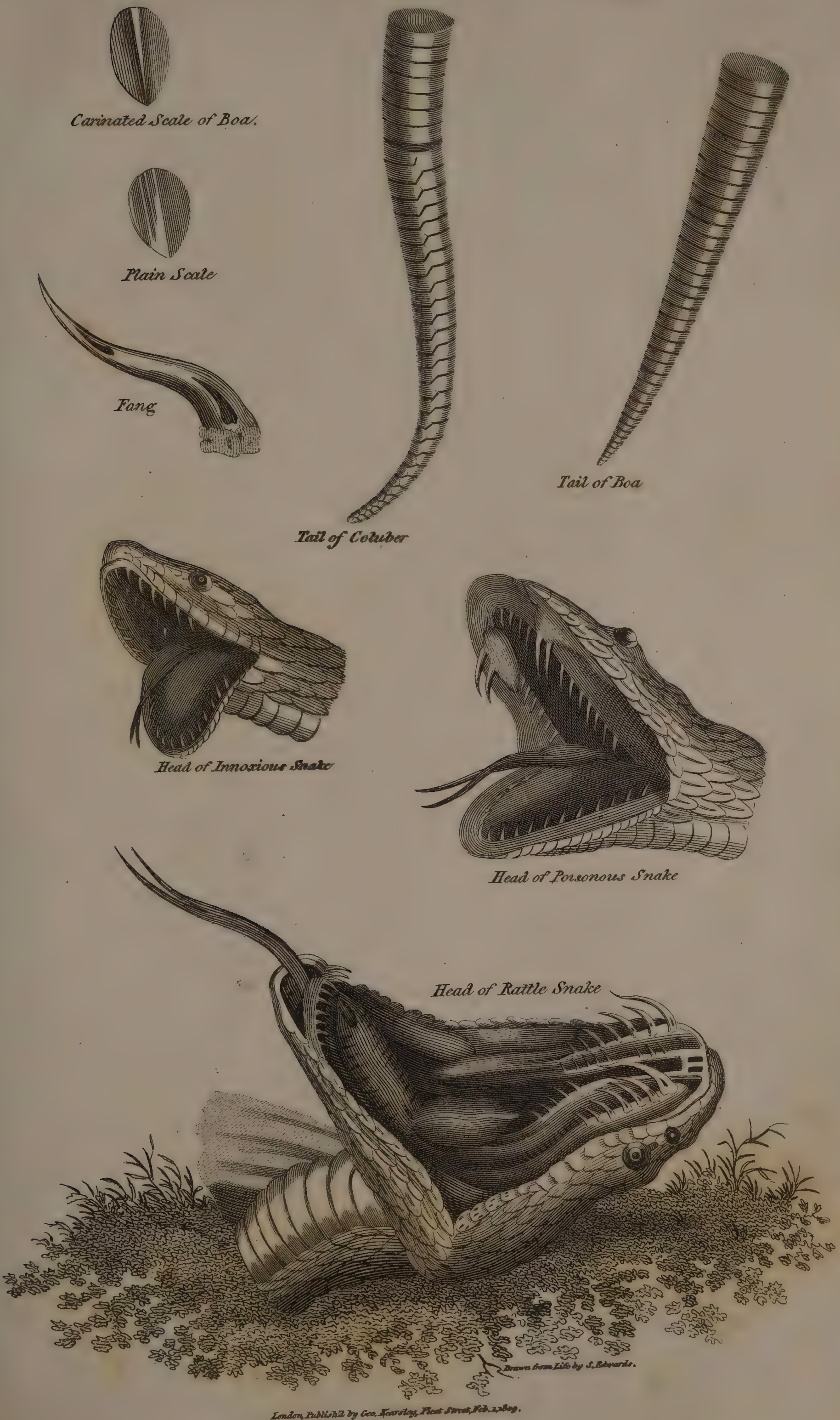
Viscera of Female Round Shark.

Drawn from Life by S. Edwards.

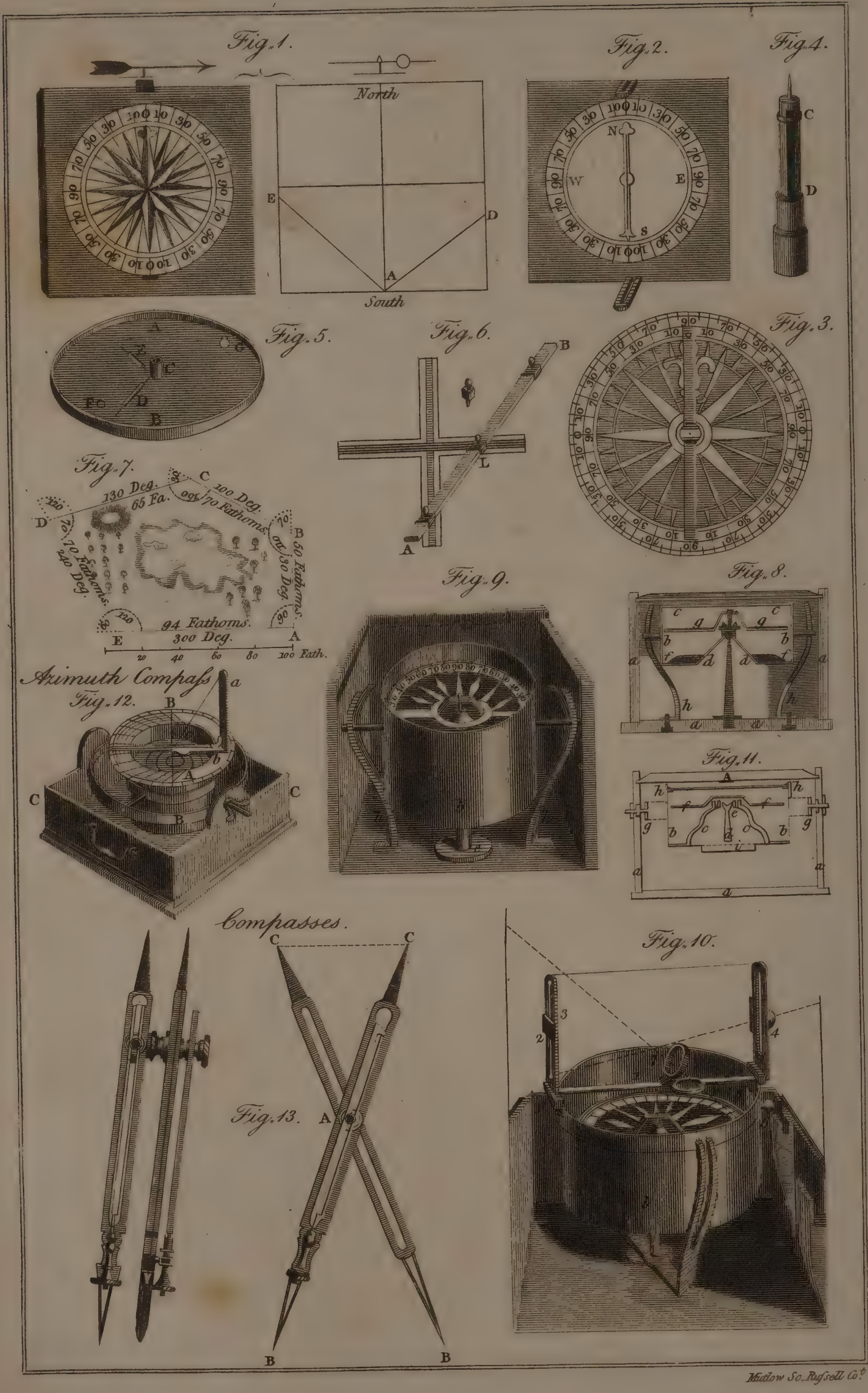
London, Publish'd by Geo. Kearsley, Fleet Street, Feb.1.1809.

COMPARATIVE ANATOMY.

PL. LXVIII.



London, Publish'd by Geo. Kearsley, Fleet Street, Feb. 1, 1809.



Mutlow Sc. Russell Cot.

Published by G. Kearsley, Fleet Street, June 1st 1809.

straight, and square at the ends; and consequently has only two poles, though about the hole in the middle the curves are a little confused. Needles of this construction, after vibrating a long time, will always point exactly in the same direction; and if drawn ever so little on one side, will return to it again, without any sensible difference. We may therefore conclude, that a regular parallelopiped is the best form for a needle, as well as the simplest, the holes for the caps being as small as possible. And as the weight should be removed to the greatest distance from the centre of motion, a circle of brass, of the same diameter as the card, may be added, which will serve also to support the card, which may then be made of thin paper, without any thing to stiffen it. This ring being fixed below the card, and the needle above it, the centre of gravity is placed low enough to admit of the cap being put under the needle, whereby the hole in the needle becomes unnecessary.

The above observations will be easily understood from viewing the several parts of the instrument as represented in Plate 46. where fig. 3. is the card, with the needle and its cap fixed upon it, being one-third of the diameter of the real card. Fig. 5. is a perspective view of the back side of the card, where AB represents the turning down of the brass edge, C the under part of the cap, D and E two sliding weights to balance the card, and F, G, two screws that fix the brass edge, &c. to the needle. Fig. 4. is the pedestal that supports the card, containing a screwing needle, fixed in two small grooves to receive it, by means of the collet C, in the manner of a port-crayon. D, the stem, is filed into an octagon, that it may be the more easily unscrewed.

The compass hath sometimes been observed to be disturbed by the electricity of its glass cover; the remedy for this inconvenience is to moisten the surface of the glass with a wet finger, which removes it immediately and effectually. The mariner's compass with a chart is much less dangerously moved than the common compass with a bare needle: and the deeper, or farther distant the needle hangs below the glass, the less disturbance it is likely to receive. Notwithstanding the various contrivances that have been made to prevent the card from being much affected by the motions of the ship, they have always been found too delicate to encounter the shocks of a tempestuous sea. Improved sea-compasses have lately been constructed by Mr. M'Culloch of London, that are reported to be the best of any yet used. We have given a representation in the Plate, where fig. 8. is a section of this compass. *Aaaa*, The common wooden-box, with its lid. *bb*, The brass compass-box. *cc*, The glass cover to ditto. *dd*, The hollow conical bottom. *e*, The prop upon which the compass is supported instead of gimbals; the spherical top of which is finely polished, and the apex of the hollow cone fitted in a peculiar manner to receive it. *ff*, A quantity of lead run round the bottom and cone of the compass-box, to balance and keep it steadily horizontal. *gg*, The card and the magnetical needle, bent in such a manner that the point of the conical pivot on which it moves and is supported, may be brought very near to the centre of gravity, as well as to the centre of motion. *hh*, Two guards, which by means of two pins *ii*, affixed to the compass-box, prevent it from turning round and deceiving the steersman. Fig. 9. a perspective view of the steering compass, with the lid off and the front laid open. *hh*, The guards. *b*, The compass-box. *e*, The prop, &c. as in figure 8. Fig. 10. a view of the azimuth compass. *b*, The compass-box. *h*, One of the guards. *e*, The prop, as in fig. 8. and 9. with this difference, that in the azimuth compass, instead of being screwed to the bottom of the wood-box, it stands in a brass socket, and may be turned round at pleasure. 1. A brass bar, upon which the sight vanes are fixed. 2. A dark glass, which moves up or down on 3. the sight vane. 4. A magnifying glass, which is also moveable on the other vane. 5. The nonius or vernier. 6. A slide for moving the vernier so as to stop the card in taking the azimuth. 7. A double convex glass, by which the divisions on the vernier may be read with accuracy. Fig. 11. is a section representing another application of the magnetic needle and card constructed by Mr. M'Culloch. *Aaaa*, The common wood box. *bb*, The brass compass-box. *cc*, The brass support for the circle and pendulum. *d*, The pendulum. *e*, The agate. *ff*, The magnetic needle and card. *gg*, The brass circle. *hh*, The glass cover and brass ring. *i*, The lead weight.—*N. B.* All the centres of motion are in the same plane. Besides possessing many advantages over the common compass, this invention is preferable to the former, in as far as the needle is both longer and broader; hence its magnetism must be stronger, and of course the line of its magnetic direction correspondent with the card.

Compass (Azimuth). This differs from the common sea compass in this; that there is fastened, on the round box wherein the card is, a broad circle AB, Plate 46. fig. 12. one half whereof is divided into 90 degrees, and those subdivided diagonally into minutes: *bc*, is an index moveable on *b*, having a sight, *b a*, erected thereon, and moving on an hinge. From the upper part of the sight to the middle of the index, is fastened a fine hypothenusal lutestring *ae*, to give a shadow on the line in the middle of the index. The circle AB is crossed at right angles with two threads, from the extremities whereof are drawn four lines on the inside of the round box: there are also four lines drawn at right angles to each other on the card. The round box fitted with its card, graduated circle, and index, is hung in the brass hoops BB, and these hoops fastened to the square box CC. Captain Middleton mentions an azimuth compass of his own contrivance, by which the variation may be determined with greater ease and exactness than by any others in use before the year 1738. He has given no particular description of it, but only shews

the manner of using it. It carries a telescope with a vertical hair in it, and may be conveniently used for taking the sun's altitude by reflection. See M'Culloch's improvement above.

COMPASS is also an instrument of considerable use in surveying land, dialing, &c. Its structure, in the main, is the same with that of the mariner's compass; consisting, like that, of a box and needle: the principal difference consists in this, that instead of the needle's being fitted into the card, and playing with it on a pivot, it here plays alone; the card being drawn on the bottom of the box and a circle divided in 360 degrees on the limb. See Plate 46. fig. 2. This instrument is of obvious use to travellers, to direct them in their road; and to miners, to show them what way to dig: with other considerable uses.

1. *To take the declination of a wall by the compass.*—Apply that side of the compass whereon the north is marked along the side of the wall; the number of degrees over which the north end of the needle fixes will be the declination of the wall, and on that side; *v. g.* if the north point of the needle tends towards the north, that wall may be shone on by the sun at noon; if it fixes over fifty degrees, counting from the north towards the east, the declination is so many degrees from north towards east. But since the needle itself declines from the north towards the west, with us 24°; it must be noted, that to retrieve the irregularity, 24° are always to be added to the degrees shown by the needle, when the declination of the wall is towards the east; on the contrary, when the declination is towards the west, the declination of the needle is to be subtracted.

2. *To take an angle with the compass.*—Suppose the angle required be DAE, fig. 1. apply that side of the compass whereon the north is marked to one of the lines AD; when the needle rests, observe the degrees at which its north point stands, which suppose 80: so many degrees does the line decline from the meridian. In the same manner take the declination of the line AE, which suppose 215°; subtract 80° from 215, the remainder is 135; which subtracted from 180, there will remain 45°; the quantity of the angle required. But if the difference between the declination of the two lines exceed 180°; in that case, 180° must be subtracted from that difference; the remainder then is the angle required. In measuring angles by the compass, there needs not any regard be had to the variation; that being supposed the same in all the lines of the angles.

3. *To take a plot of a field by the compass.*—Suppose the field A,B,C,D,E, fig. 7. For the greater accuracy let there be two sights fitted to the meridian line of the compass, place it horizontally, and through the sights look along the side AB, or a line parallel to it; applying the eye to the sight at the south point of the compass. Draw a rough sketch of the field by the eye, and on the corresponding line enter down the degree to which the needle points, which suppose 90; measure the length of the side, and enter that too, which suppose 10 chains. In this manner proceed with all the rest of the sides and angles of the field; the sides, which suppose 70, 65, 70, 50, 94 fathoms; and the angles, which suppose 30, 100, 130, 240, 300 degrees. To protract the field, set down the several angles observed, one after another, and subtract the lesser from the next greater: thus will you have the quantity of the several angles, and the length of the lines that include them.—*Note,* All the angles of the figure taken together, must make twice as many right angles; abating four (if no mistake has been committed), as the figure has sides.

Mr. Nicholson, in a paper published in the 9th number of his valuable Journal, endeavours to prove, that the compass is very little disturbed by tilting the box on one side, but very much by sudden horizontal changes of place; that a scientific provision against the latter is therefore the chief requisite in a well made instrument of this kind; and that no other provision is requisite, or can easily be obtained, than good workmanship according to the common construction, and a proper adjustment of the weight with regard to the centres or axes of suspension The same author is of opinion, that it would greatly improve the compass to make the needle flat and thin, and to suspend it, not, as is most commonly done, with its flat side, but with its edge uppermost; for it being a well-known fact, that soft steel loses its magnetism sooner than hard, it is obvious, that unless both sides of a needle be equally hard (which is almost impossible if they be distant from each other), the magnetic power will, in process of time, deviate towards the harder side.

COMPASS (The Chinese), has some advantages over the European compass, from which it differs with respect to the length of the needle, and the manner in which it is suspended. In the compass of China, the magnetic needle is seldom above an inch in length, and is less than a line in thickness. It is poised with great nicety, and is remarkably sensible, or, in other words, points steadily towards the same portion of the heavens. This steadiness is accomplished by the following contrivance: A piece of thin copper is strapped round the centre of the needle. This copper is rivetted by its edges to the upper part of a small hemispherical cup, of the same metal, turned downwards. The cup so inverted serves as a socket to receive a steel pivot rising from a cavity made into a round piece of light wood or cork, which thus forms the compass-box. The surfaces of the socket and pivot, intended to meet each other, are perfectly polished, to avoid, as much as possible, all friction. The cup has a proportionably broad margin, which, beside adding to its weight, tends, from its horizontal position, to keep the centre of gravity, in all situations of the compass, nearly in coincidence with the centre of suspension. The cavity, in which the needle is thus suspended, is in form circular, and is little more than sufficient to remove the needle, cup, and pivot. Over this cavity is placed a thin piece of transparent talc, which prevents the needle from being affected

by any motion of the external air; but permits the apparent motion of the former to be easily observed. The small and short needle of the Chinese has a material advantage over those of the usual size in Europe, with regard to the inclination or dip towards the horizon; which, in the latter, requires that one extremity of the needle should be made so much heavier than the other as will counteract the magnetic attraction. This being different in different parts of the world, the needle can only be accurately true at the place for which it had been constructed. But in short and light needles, suspended after the Chinese manner, the weight below the point of suspension is more than sufficient to overcome the magnetic power of the dip or inclination in all situations of the globe; and therefore such needles will never deviate from their horizontal position."

COMPASSES, or PAIR OF COMPASSES, a mathematical instrument for describing circles, measuring and dividing lines, or figures, &c.

The common compasses consist of two sharp-pointed branches or legs of iron, steel, brass, or other metal, joined together at the top by a rivet, about which they move as on a centre. Those compasses are of the best sort in which the pin or axle, on which the joint turns, is made of steel, and also half the joint itself, as the opposite metals wear more equally: the points should also be made of hard steel, well polished; and the joint should open and shut with a smooth, easy, and uniform motion. In some compasses, the points are both fixed; but in others, one is made to take out occasionally, and a drawing-pen, or pencil, put in its place.

There are in use compasses of various kinds and contrivances, adapted to the various purposes they are intended for; as,

Compasses of three Legs, or Triangular Compasses; the construction of which is like that of the common compasses, with the addition of a third leg or point, which has a motion every way. Their use is to take three points at once, and so to form triangles, and lay down three positions of a map to be copied at once.

Beam Compasses consist of a long straight beam or bar, carrying two brass cursors; one of these being fixed at one end, the other sliding along the beam, with a screw to fasten it on occasionally. To the cursors may be screwed points of any kind, whether steel, pencils, or the like. To the fixed cursor is sometimes applied an adjusting or micrometer screw, by which an extent is obtained to very great nicety. The beam compasses are used to draw large circles, to take great extents, or the like. The construction of beam compasses has been lately improved by Mr. Walton of Woolwich. See Gregory's Mechanics, vol. ii.

Bow Compasses, or *Bows*, are a small sort of compasses, that shut up in a hoop, which serves for a handle. Their use is to describe arcs or circumferences with a very small radius.

Caliber Compasses. See CALIBER.

Cylindrical and Spherical Compasses, consist of four branches, joined in a centre, two of which are circular, and two flat, a little bent at the ends: their use is to take the diameter, thickness, or caliber of round or cylindric bodies; such as guns, pipes, &c.

Elliptic Compasses.—Their use is to draw ellipses, or ovals of any kind; they consist of a beam AB, Plate 46. fig. 6. about a foot long, bearing three cursors; to one of which may be screwed points of any kind; to the bottom of the other two are riveted two sliding dove-tails, adjusted in grooves made in the cross branches of the beam. The dove-tails having a motion every way, by turning about the long branch, go backwards and forwards along the cross; so that when the beam has gone half way about, one of these will have moved the whole length of one of the branches, and when the beam has got quite round, the same dove-tail has got back the whole length of the branch. The same may be said of the other dove-tail.—*Note*, the distance between the two sliding dove-tails is the distance between the two foci of the ellipsis; so that by changing that distance, the ellipsis will be rounded or slenderer. Under the ends of the branches of the cross are placed four steel points to keep it fast. The use of this compass is easy; by turning round the long branch, the ink pencil, or other point, will draw the ellipsis required. Its figure shows both its use and construction.

German Compasses, have their legs a little bent outwards, towards the top; so that when shut, the points only meet.

Hair Compasses are so contrived within side by a small adjusting screw to one of the legs, as to take an extent to a hair's breadth.

Proportional Compasses are those which joint lies, not at the end of the legs, but between the points terminating each leg. These are either simple, or compound. In the former sort the centre, or place of the joint is fixed; so that one pair of these serves only for one proportion.

Compound Proportional Compasses have the joint or centre moveable. They consist of two parts or sides of brass, which lie upon each other so nicely as to seem but one when they are shut. These sides easily open, and move about the centre, which is itself moveable in a hollow canal cut through the greatest part of their length. To this centre on each side is fixed a sliding piece, of a small length, with a fine line drawn on it serving as an index, to be set against other lines or divisions placed upon the compasses on both sides. These lines are, 1. A line of lines; 2. a line of superficies, areas, or planes, the numbers on which answer to the squares of those on the line of lines; 3. a line of solids, the numbers on which answer to the cubes of those on the line of lines; 4. a line of circles, or rather of polygons to be inscribed in circles. These lines are all unequally divided, the first three from 1 to 20, and the last from 6 to 20. The use of the first is to divide a line into any number of equal parts; by the 2d and 3d are found the sides of like planes or solids in any given proportion; and by the 4th, circles are divided into any number of equal parts, or any polygons inscribed in them. See Plate 46. fig. 13.

Spring Compasses, or *Dividers*, are made of hardened steel, with an arched head, which by its spring opens the legs; the opening being directed by a circular screw fastened to one of the legs, let through the other, and worked with a nut.

COMPASSING THE KING'S DEATH, in law. See TREASON.

COMPASSION, in ethics, is that species of affection, which is excited either by the actual distress of its object, or by some impending calamity which appears inevitable. It is a benevolent sorrow at their sufferings or approaching misery. The etymology of the word expresses this idea with strict propriety; as it signifies suffering with the object. "Compassion," says Dr. Cogan, "is always connected with a disposition to relieve, and will always prompt to vigorous exertions, wherever there is a possibility of success; unless some important considerations should render the endeavours improper or unjust. Compassion has no necessary connection with the character of its objects. Their distress is a sufficient excitement. It is frequently exercised upon the unworthy, whose reiterated imprudences or vicious conduct, may have been the cause of their wretchedness. From the great extent and universality of this affection, it may justly be considered as a generic name, comprehending several other affections which have a more specific application; as mercy, commiseration, pity, &c.

To COMPA'SSION. *v. a.* (from the noun.) To pity; to commiserate (*Shakspeare*).

COMPA'SSIONATE. *a.* (from *compassion.*) Inclined to pity; merciful; tender (*South*).

To COMPA'SSIONATE. *v. a.* (from the noun.) To pity; to commiserate (*Raleigh*).

COMPA'SSIONATELY. *ad.* (from *compassionate.*) Mercifully; tenderly (*Claren.*).

COMPATE'RNITY. *s.* (*con* and *paternitas*, Lat.) The relation of godfather to the person for whom he answers (*Davies*).

COMPATIBI'LITY. *s.* (from *compatible.*) Consistency; the power of coexisting with something else; agreement with any thing.

COMPA'TIBLE. *a.* (corrupted, by pronunciation, from *competible.*) 1. Suitable to; fit for; consistent with (*Hale*). 2. Consistent; congruous: agreeable (*Broome*).

COMPA'TIBLENESS. *s.* Consistency; agreement with any thing.

COMPA'TIBLY. *ad.* Fitly; suitably.

COMPA'TIENT. *a.* (*con* and *patior*, Lat.) Suffering together.

COMPA'TRIOT. *s.* (*con* and *patria*, Lat.) One of the same country (*Drummond*).

COMPE'ER. *s.* (*compar*, Latin.) Equal; companion; colleague; associate (*Philips*).

To COMPE'ER. *v. a.* To be equal with; to mate (*Shakspeare*).

To COMPE'L. *v. a.* (*compello*, Latin.) 1. To force to some act; to oblige; to constrain; to urge irresistibly (*Clarendon*). 2. To take by force or violence (*Shakspeare*). 3. To seize; to overpower (*Dryden*).

COMPE'LLABLE. *a.* (from *compel.*) That may be forced.

COMPELLA'TION. *s.* (from *compello*, Latin.) The style of address (*Duppa*).

COMPE'LLER. *s.* (from *compel.*) He that forces another.

CO'MPEND. *s.* (*compendium*, Latin.) Abridgment; summary; epitome (*Watts*).

COMPENDIA'RIOUS. *a.* (*compendiarius*, Latin.) Short; contracted; summary.

COMPENDIO'SITY. *s.* (from *compendious.*) Shortness; contracted brevity.

COMPE'NDIOUS. *a.* (from *compendium.*) Short; summary; comprehensive (*Woodward*).

COMPE'NDIOUSLY. *ad.* Shortly; summarily; in epitome (*Hooker*).

COMPE'NDIOUSNESS. *s.* (from *compendious.*) Shortness; brevity (*Bentley*).

COMPE'NDIUM. *s.* (Lat.) Abridgment; summary; breviate (*Watts*).

COMPE'NSABLE. *a.* (from *compensate.*) That may be recompensed.

To COMPE'NSATE. *v. a.* (*compenso*, Latin.) To recompense; to counterbalance; to countervail; to make amends for (*Prior*).

COMPENSA'TION. *s.* (from *compensate.*) Recompense; something equivalent (*Dryden*).

COMPENSATION, in horology, is a contrivance in the pendulum of a clock, by means of which, while the expansion from increase of temperature depresses the centre of gravity of some of the vibrating parts, other parts are made to ascend nearer the centre of suspension, or else to draw up the pendulum, so as to preserve the centre of oscillation of the compound pendulum at an invariable distance; and in consequence to keep all the vibrations to the same time.

Compensation pendulums have the part which expands upwards made either of brass or zinc, or some very expansible metal, while the descending parts are usually iron or steel, and some of these have leaves or machinery in their construction; in others, the compensation-part does not vibrate, but serves to alter the length of a simple pendulum; and in others a fluid is used, most commonly mercury. See HOROLOGY and PENDULUM.

COMPENSATION (Balance), in horology, a contrivance, by means of which, the errors in the going of a watch, occasioned by the variation of temperature, may be corrected or compensated by varying the diameter of the balances. In a compensation balance, two different kinds of matter are made use of that possess different degrees of expansibility, and the pieces are so adjusted that their expansions shall compensate or balance each other. The principal compensations have been invented by Harrison, Berthoud, Cumming, Breguet, James Scott, P. Le Roy, Arnold, Emery, &c.

COMPE'NSATIVE. *a.* (from *compensate.*) Such as compensates or countervails.

To COMPE'NSE. *v. a.* (*compenso*, Latin.) To compensate; to be equivalent to; to recompense (*Bacon*).

To COMPERE'NDINATE. *v. a.* (*comperendino*, Lat.) To delay.

COMPERENDINA'TION. *s.* (from *comperendinate.*) Delay; dilatoriness.

CO'MPETENCE. CO'MPETENCY. *s.* (from

competent.) 1. Such a quantity of any thing as is sufficient, without superfluity (*Gov. of the Tongue*). 2. A fortune equal to the conveniences of life (*Shakspeare*). 3. The power or capacity of a judge or court, for taking cognisance of an affair.

CO'MPETENT. *a.* (*competens*, Latin.) 1. Suitable; fit; adequate (*Bacon*). 2. Adapted to any purpose without defect or superfluity (*Hooker*). 3. Reasonable; moderate (*Atter.*). 4. Qualified; fit (*Gov. of the Tongue*). 5. Consistent with; incident to (*Locke*).

CO'MPETENTLY. *ad.* (from *competent.*) 1. Adequately; properly (*Bentley*). 2. Reasonably; moderately (*Wotton*).

COMPETIBLE. *a.* (*competo*, Lat.) Suitable to; consistent with (*Hammond*).

COMPETIBLENESS. *s.* (from *competible.*) Suitableness; fitness.

COMPETI'TION. *s.* (*con* and *petitio*, Lat.) 1. Rivalry; contest (*Rogers*). 2. Claim of more than one to one thing (*Bacon*).

COMPE'TITOR. *s.* (*con* and *petitor*, Lat.) 1. A rival (*Rogers*). 2. An opponent (*Sh.*)

COMPHRY, in botany. See SYMPHYTUM.

COMPIEGNE, a handsome town of France, in the department of Oise and late province of the Isle of France. It is seated near an extensive forest, at the confluence of the Aisne and Oise. Here is a palace, in which the kings of France often resided. The Maid of Orleans was taken prisoner here in 1430. It is 45 miles N.E. of Paris. Lon 2. 55 E. Lat. 49. 25 N.

COMPILA'TION. *s.* (from *compilo*, Lat.) 1. A collection from various authors. 2. An assemblage: a coacervation (*Woodward*).

To COMPI'LE. *v. a.* (*compilo*, Latin.) 1. To draw up from various authors. 2. To write; to compose (*Temple*). 3. To contain; to comprise (*Spenser*).

COMPI'LEMENT. *s.* (from *compile.*) Coacervation; the act of heaping up (*Wotton*).

COMPI'LER. *s.* (from *compile.*) A collector; one who frames a composition from various authors.

COMPITALIA, or COMPITALITIA, feasts held among the Romans in honour of the Lares, and Mania.

During the celebration of these feasts, each family placed at the door of their house the statue of the goddess Mania: they also hung up at their doors figures of wool, representing men and women; accompanying them with supplications that the Lares and Mania would be contented with those figures, and spare the people of the house.

As for slaves, in lieu of the figures of men, they offered balls or fleeces of wool. Servius Tullus ordered, that the slaves who assisted at the compitalia should be free during the whole time of the feast. Augustus ordered the statues of the Lares, placed in the cross-ways, to be adorned with flowers twice a year.

COMPLA'CENCE. COMPLA'CENCY. *s.* (*complacentia*, low Latin.) 1. Pleasure; satisfaction; gratification (*South*). 2. The cause of pleasure; joy (*Milton*). 3. Civility; complaisance (*Clarendon*).

COMPLA'CENT. *a.* (*complacens*, Latin.) Civil; affable; soft; complaisant.

To COMPLA'IN. *v. n.* (*complaindre*, Fr.) 1. To mention with sorrow or resentment; to murmur; to lament (*Dryden*). 2. To inform against (*Shakspeare*).

To COMPLA'IN. *v. a.* To lament; to bewail (*Dryden*).

COMPLA'INANT. *s.* (from *complain.*) One who urges a suit against another (*Collier*).

COMPLA'INER. *s.* One who complains; a lamenter; a murmurer (*Gov. of Tongue*).

COMPLA'INT. *s.* (*complainte*, French.) 1. Representation of pains or injuries (*Job*). 2. The cause or subject of complaint (*Swift*). 3. A malady; a disease (*Arbuthnot*). 4. Remonstrance against (*Shakspeare*).

COMPLAISA'NCE. *s.* (*complaisance*, Fr.) Civility; desire of pleasing; act of adulation (*Dryden. Prior*).

COMPLAISA'NT. *a.* (*camplaisant*, Fr.) Civil; desirous to please (*Pope*).

COMPLAISA'NTLY. *ad.* Civilly; with desire to please; ceremoniously (*Pope*).

COMPLAISA'NTNESS. *s.* (from *complaisant.*) Civility; compliance.

To COMPLA'NATE. *To* COMPLA'NE. *v. a.* (from *planus*, Latin.) To level; to reduce to a flat surface (*Derham*).

CO'MPLEMENT. *s.* (*complementum*, Lat.) 1. Perfection; fulness; completion (*Hooker*). 2. Complete set; complete provision; the full quantity or number (*Prior*). 3. Adscititious circumstances; appendage (*Shakspeare*).

COMPLEMENT (Arithmetical). See ARITHMETICAL.

COMPLEMENT OF LIFE, a term much used, in the doctrine of life annuities, by De Moivre; according to him, it denotes the number of years which a given life wants of 86, this being the age which he considered as the utmost probable extent of life. So 56 is the complement of 30, and 30 is the complement of 56.

COMPLEMENT, in astronomy, the distance of a star from the zenith; or the arch comprehended between the place of the star above the horizon and the zenith.

COMPLEMENT, in geometry, is what remains of a quadrant of a circle, or of 90°, after any certain arch has been taken away from it. The sine of the complement of an arch is called the cosine, and that of the tangent, the cotangent, &c.

COMPLEMENT OF AN INTERVAL, in music, that which it wants of an octave.

COMPLEMENTS OF A PARALLELOGRAM, are the two smaller parallelograms made by drawing two right lines through a point in the diagonal: and parallel to the side of a parallelogram. In every parallelogram these complements are equal.

COMPLE'TE. *a.* (*completus*, Latin.) 1 Perfect; full; having no deficiencies (*Hooker*) 2. Finished; ended; concluded (*Prior*).

To COMPLE'TE. *v. a.* (from the noun.) To perfect; to finish (*Walton*).

COMPLE'TELY. *ad.* (from *complete.*) Fully; perfectly (*Swift*).

COMPLE'TEMENT. *s.* (*completement*, French.) The act of completing (*Dryden*).

COMPLE'TENESS. *s.* (from *complete.*) Perfection; the state of being complete.

COMPLE'TION. *s.* (from *complete.*) 1. Accomplishment; act of fulfilling (*South*). 2. Utmost height; perfect state (*Pope*).

CO'MPLEX. *a.* (*complexus*, Lat.) Composite; of many parts; not simple (*Locke*).

COMPLEX TERMS, or IDEAS, in logic, are such as are compounded of several simple ones.

Complex ideas are often considered as single and distinct beings, though they may be made up of several simple ideas, as a body, a spirit, a horse, a flower: but when several of these ideas of a different kind are joined together, which are wont to be considered as distinct, single beings, they are called a compounded idea, whether these united ideas be simple or complex. Complex ideas, however compounded and recompounded, though their number be infinite, and their variety endless, may be all reduced under these three heads, modes, substances, and relations.

COMPLEX PROPOSITION, is either that which has at least one of its terms complex, or such as contains several members, as causal propositions; or it is several ideas offering themselves to our thoughts at once, whereby we are led to affirm the same thing of different objects, or different things of the same object. Thus, God is infinitely wise, and infinitely powerful. In like manner, in the proposition, "Neither kings nor people are exempt from death."

CO'MPLEX. *s.* (from the adjective.) Complication; collection (*South*).

COMPLE'XEDNESS. *s.* (from *complex.*) Complication; involution of many particular parts in one integral (*Locke*).

COMPLE'XION. *s.* (*complexio*, Latin.) 1. The enclosure or involution of one thing in another (*Watts*). 2. The colour of the external parts of any body (*Davies*). 3. The temperature of the body (*Dryden*).

COMPLE'XION, a term technically denoting the temperament, habitude, and natural disposition of the body; but popularly signifying the colour of the face and skin. Few subjects have engaged the attention of naturalists more than the diversities among the human species, among which that of colour is the most remarkable. The great differences in this respect have given occasion to several authors to assert, that the whole human race have not sprung from one original; but that as many different species of men were at first created as there are now different colours to be found among them. It remains, in reality, a matter of no small difficulty to account for the remarkable variations of colour that are to be found among different nations. Dr. Hunter, who considered the matter more accurately than has commonly been done, determines absolutely against any specific difference among mankind. He introduces his subject by observing, that when the question has been agitated, whether all the human race constituted only one species or not, much confusion has arisen from the sense in which the term *species* has been adopted. He therefore thinks it necessary to set out with a definition of the term. He includes under the same species all those animals which produce issue capable of propagating others resembling the original stock from whence they sprung. This definition he illustrates by having recourse to the human species as an example. And in this sense of the term he concludes, that all of them are to be considered as belonging to the same species. And as, in the case of plants, one species comprehends several varieties depending upon climate, soil, culture, and similar accidents; so he considers the diversities of the human race to be merely varieties of the same species, produced by natural causes.

Upon the whole, colour and figure may be styled habits of the body. Like other habits, they are created, not by great and sudden impressions, but by continual and almost imperceptible touches. Of habits, both of mind and body, nations are susceptible as well as individuals. They are transmitted to the offspring, and augmented by inheritance. Long in growing to maturity, national features, like national manners, become fixed only after a succession of ages. They become, however, fixed at last; and if we can ascertain any effect produced by a given state of weather or of climate, it requires only repetition during a sufficient length of time, to augment and impress it with a permanent character. The sanguine countenance will, for this reason, be perpetual in the highest latitudes of the temperate zone; and we shall always find the swarthy, the olive, the tawny, and the black, as we descend to the south. See farther, the article HOMO.

COMPLE'XIONAL. *a.* (from *complexion.*) Depending on the complexion or temperament of the body (*Fiddes*).

COMPLE'XIONALLY. *ad.* By complexion (*Brown*).

COMPLE'XLY. *ad.* (from *complex.*) In a complex manner; not simply.

COMPLE'XNESS. *s.* (from *complex.*) The state of being complex.

COMPLE'XURE. *s.* (from *complex.*) The involution of one thing with others.

COMPLEXUS. (*complexus*, from *complector*, to comprise.) A muscle situated on the back part of the neck, that draws the head backwards, and to one side; and when both act, they draw the head directly backward. It arises from the transverse processes of the seven superior vertebræ of the back, and four inferior of the neck, by as many distinct tendinous origins; in its ascent it receives a fleshy slip from the spinous process of the first vertebræ of the back: from these different origins it runs upwards, and is every where intermixed with tendinous fibres. It is inserted, tendinous and fleshy, into the inferior edge of the protuberance in the middle of the os occipitis,

and into a part of the curved line that runs forwards from that protuberance.

COMPLI'ANCE. *s.* (from *comply.*) 1. The act of yielding to any desire or demand; according; submission (*Rogers*). 2. A disposition to yield to others (*Clarendon*).

COMPLI'ANT. *a.* (from *comply.*) 1. Yielding; bending (*Milton*). 2. Civil; complaisant.

To CO'MPLICATE. *v. a.* (*complico*, Lat.) 1. To entangle one with another; to join; to involve mutually (*Tillotson*). 2. To unite by involution of parts (*Boyle*). 3. To form by complication; to form by the union of several parts into one integral (*Locke*).

Co'mplicate. *a.* (from the verb.) Compounded of a multiplicity of parts (*Watts*).

CO'MPLICATENESS. *s.* (from *complicate.*) The state of being complicated; intricacy; perplexity (*Hale*).

COMPLICA'TION. *s.* (from *complicate.*) 1. The act of involving one thing in another. 2. The state of being involved one in another (*Wilkins*). 3. The integral consisting of many things involved, perplexed, and united (*Watts*).

CO'MPLICE. *s.* (Fr. from *complex*, Latin.) One who is united with others in an ill design; a confederate (*Clarendon*).

COMPLI'ER. *s.* (from *comply.*) A man of an easy temper (*Swift*).

CO'MPLIMENT. *s.* (*compliment*, Fr.) An act or expression of civility, usually understood to mean less than it declares (*Sidney*).

To Complime'nt. *v. a.* (from the noun.) To sooth with expressions of respect; to flatter; to praise (*Prior*).

To Complime'nt. *v. n.* To use ceremonious or adulatory language (*Pope*).

COMPLIME'NTAL. *a.* (from *compliment.*) Expressive of respect or civility (*Wotton*).

COMPLIME'NTALLY. *ad.* In the nature of a compliment; civilly (*Broome*).

CO'MPLIMENTER. *s.* (from *compliment.*) One given to compliments; a flatterer.

CO'MPLINE. *s.* (*compline*, Fr.) The last act of worship at night (*Spenser*).

To COMPLO'RE. *v. n.* (*comploro*, Latin.) To make lamentation together.

COMPLO'T. *s.* (French.) A confederacy in some secret crime; a conspiracy (*Shakspeare*).

To Complo't. *v. a.* (from the noun.) To form a plot; to conspire (*Pope*).

COMPLO'TTER. *s.* (from *complot.*) A conspirator; one joined in a plot (*Dryden*).

COMPLUTENSIAN BIBLE. See Bibles (Greek).

To COMPLY'. *v. n.* (*complier*, Fr.) To yield to; to be obsequious to (*Tillotson*).

COMPO'NENT. *a.* (*componens*, Latin.) That constitutes a compound body (*Newton*).

To COMPO'RT. *v. n.* (*comporter*, Fr.) To agree; to suit (*Donne*).

To Comport. *v. a.* 1. To bear; to endure (*Daniel*). 2. To behave; to carry (*Congreve*).

Compo'rt. *s.* (from the verb.) Behaviour; conduct; manner of acting (*Taylor*).

COMPO'RTABLE. *a.* (from *comport.*) Consistent; not contradictory (*Wotton*).

COMPO'RTANCE. *s.* (from *comport.*) Behaviour; gesture of ceremony (*Spenser*).

COMPO'RTMENT. *s.* (from *comport.*) Behaviour; mien; demeanour (*Addison*).

COMPOS MENTIS. See Non compos.

To COMPO'SE. *v. a.* (*composer*, French.) 1. To form a mass by joining different things together (*Sprat*). 2. To place any thing in its proper form and method (*Dryden*). 3. To dispose; to put in the proper state for any purpose (*Clarendon*). 4. To put together a discourse or sentence; to write as an author (*Hooker*). 5. To constitute by being parts of a whole (*Watts*). 6. To calm; to quiet (*Clarendon*). 7. To adjust the mind to any business (*Duppa*). 8. To adjust; to settle: as, *to* compose *a difference*. 9. (With printers.) To arrange the letters. 10. (In musick.) To form a tune from the different musical notes.

COMPO'SED. *particip. a.* Calm; serious; even; sedate (*Addison*).

COMPO'SEDLY. *ad.* Calmly; seriously; sedately (*Clarendon*).

COMPO'SEDNESS. *s.* Sedateness; calmness; tranquillity (*Norris*).

COMPO'SER. *s.* (from *compose.*) 1. An author; a writer (*Milton*). 2. He that adapts the musick to words (*Peacham*).

COMPO'SITÆ, or Compo'siti. The name of the twenty-first order in the fragments of a natural method in Linnéus's Philos. Botan.: the forty-ninth of the natural orders in his Gen. Pl. in Royen's System, and others. Comprising the plants with compound flowers.

COMPOSITE ORDER, in architecture, the last of the five orders of columns; so called, because its capital is composed out of those of the other orders. See Capital.

This order, though it has many admirers, must be pronounced defective, for it is in most respects so similar to the Corinthian, that even a good judge can scarcely distinguish the one from the other; while the merest novice in architecture can at once distinguish the Tuscan from the Doric, and the Ionic from the Corinthian. The composite may, perhaps, be best distinguished from the Corinthian by the volutes, which in the former order resemble those of the Ionic; the Corinthian capital has three tiers of leaves, the composite two. This order had its origin among the ancient Romans; its general proportions follow: the height of the entire order is divided into five equal parts, one of which is appropriated for the height of the pedestal, and the remaining four, for the column and entablature. These four parts being again divided into six; one is for the entablature, and the remaining five for the height of the column, including its base and capital. The height of the column is divided into 10 equal parts, one of which is given to the inferior diameter. The base is 30 minutes, the capital 70 in height, adorned with acanthus leaves, and volutes, drawn by the same method as those of the Ionic: and the

plan of the capital is the same with that of the Corinthian order.

The soffit of the corona is divided into square compartments cut out of the solid, decorated with roses whose relief must not project more than the borders which inclose them. In rich compositions, the soffits of the modillions are also ornamented; but their relief is not to exceed the horizontal surface, which would greatly injure the effect of the modillion, and render the appearance of the profile of the entablature less pleasing.

COMPOSITE, in general, denotes something compounded, or made up of several others united together: thus, composite numbers, are such as can be measured exactly by a number exceeding unity; as 6 by 2 or 3, or 10 by 5, &c. so that 4 is the lowest composite number. Composite numbers, between themselves, are those which have some common measure besides unity; as 12 and 15, as being both measured by 3.

COMPOSITION. *s.* (*compositio*, Latin.) 1. The act of forming an integral of various dissimilar parts (*Bacon. Temple*). 2. The act of bringing simple ideas into complication: opposed to analysis (*Newton*). 3. A mass formed by mingling different ingredients (*Swift*). 4. The state of being compounded; union; conjunction; combination (*Watts*). 5. The arrangement of various figures in a picture (*Dryden*). 6. Written work (*Addison*). 7. Adjustment; regulation (*Ben Jonson*). 8. Compact; agreement (*Waller*). 9. The act of discharging a debt by paying part; the sum paid. 10. Consistency; congruity (*Shakspeare*). 11. (In grammar.) The joining of two words together, or the prefixing a particle to another word, to augment, diminish, or change its signification. 12. A certain method of demonstration in mathematicks, which is the reverse of the analytical method, or of resolution (*Harris*). See ANALYSIS.

COMPOSITION (Forsyth's) FOR DECAYED TREES. See COMPOST.

COMPOSITION AND RESOLUTION OF FORCES. See PARALLELOGRAM OF FORCES.

COMPOSITION, in music, the art of composing not only an agreeable air; but also a great many airs in such a manner that, when heard at the same time, they may, united, produce an effect agreeable and delightful to the hearers. A complete knowledge of the rules of melody and harmony is the foundation of composition. It is absolutely necessary to know in what manner chords should be filled, how to prepare and resolve dissonances, to find the fundamental bass, and to put in practice all the other minutiæ of elementary knowledge; but with the mechanical rules of harmony alone, one is by no means better qualified to understand the art, and operate in the practice of composition, than to form himself for eloquence upon all the rhetorical precepts exhibited in grammar. We need not say, that besides this, it is necessary to understand the genius and compass of voices and instruments; to judge what airs may be of easy, and what of difficult execution; to observe what will, and what will not, be productive of any effect; to feel the character of different movements, as well as that of different modulations, that both may be always suitably applied; to know the different rules established by convention, by taste, by caprice, or by pedantry, as fugues, imitations, or pieces where the subject is confined to uniform laws in its harmony, melody, rithmus, &c. All these acquisitions are still no more than preparatives for composition: but the composer must find in his own genius the sources of beautiful melody, of sublime harmony, the picturesque, and the expressive in music; he must, in short, be capable of perceiving, and of forming, the order of the whole piece; to follow the relations and aptitudes of which it is susceptible in every kind; to inflame his soul with the spirit and enthusiasm of the poet, rather than childishly amuse himself with punning in harmony, or adapting the music in each particular word. With these views we shall not attempt to prescribe rules for composition, since a volume of directions would be of small utility, except to those who are possessed of musical genius: such we refer to D'Alembert's Theory of Music, a translation of which, with some valuable annotations, may be found under the article music, in the English Encyclopædia. Other concise remarks will be given, at the articles COUNTERPOINT, DESCANT, HARMONY, MUSIC, &c. in this work.

The name of composition is, likewise, given to such pieces of music as are formed according to the rules of the art. For this reason, duetts, trios, quartettos, &c. are called compositions.

A few years ago, a German invented an instrument for composers: it consists of an harpsichord, which by certain machinery added to it, notes down any air while a person is playing it. Were this instrument accurate in practice, it would be of great advantage to composers, as they would by it be enabled, when hurried away by the fervour of their imagination, to preserve what had received a fleeting existence, and what it would otherwise be impossible for them to remember. But it has not yet been found so useful as its inventor expected. It is described in Mem. Acad. Berol. 1773.

COMPOSITION OF PROPORTION, is when of four proportionals, the sum of the 1st and 2d, is to the 2d, as the sum of the 3d and 4th, is to the 4th. See PROPORTIONALS.

COMPOSITION OF RATIOS, in arithmetic and algebra, is performed by multiplying the quantities or exponents of two or more ratios together; the produce is then said to be compounded of the ratios whose components were multiplied. Thus if the quantities or exponents of the ratios a to b, c to d, e to f, be multiplied, we shall have $\frac{a}{b}\times\frac{c}{d}\times\frac{e}{f}=\frac{ace}{bdf}$

And the ratio ace to bdf, is then said to be compounded of the several ratios a to b, c to d, e to f, &c. Thus also the ratio of 10 to

12, is compounded of the ratio 2 to 3, and of 5 to 4; for $\frac{2}{3} \times \frac{5}{4} = \frac{10}{12}$. This is often called addition of ratios.

COMPO'SITIVE. *a.* Compounded; or, having the power of compounding.

COMPO'SITOR. *s.* (from *compose.*) He that arranges and adjusts the types in printing.

COMPOST, in botany, garden manure: such earthy and saline, or other substances, as in a state of combination constitute the means of improving a soil for the growth of garden-plants.

As almost all sorts of plants and vegetables, though they succeed better in some kinds of soil than others, grow well in mould, which is duly impregnated with vegetable materials, it is not necessary to have recourse to the preparation of such substances as are tedious and troublesome in their mode of composition, except for particular plants, whether of the esculent, flower, shrub, or tree kinds.

For the purpose of improving the condition of garden grounds in general, the substances should be suited to their particular qualities and properties; as where they are of a light, loose, gravelly, or sandy nature; the application of loamy and other sorts of heavy earthy matters in combination with well rotted dung, will be beneficial; while such as are of a heavy, clayey, or loamy kind, will be greatly ameliorated by the use of light sandy earth, scrapings of roads, sea-sand, ashes, the reduced bark of hot-beds, sawdust, and other decayed ligneous materials, with a proper proportion of good rotten dung.

Most of the esculent sorts of plants succeed perfectly in good vegetable mould of moderate adhesion, such as is met with in gardens that have been some time under cultivation.

Some particular sorts of plants require such as is loose and light, as those of the moist bulbous-rooted tribes; others, such as is dry, sandy, or calcareous, as those of the more succulent kinds; and that of the rich, loamy description, is in general well adapted to the growth of most sorts of trees and shrubby plants; and earthy compositions of the boggy kind are suited to the raising of particular sorts of plants and flowers.

The composts most usually employed for the more tender curious plants in pots, tubs, and hot-beds, are for the less delicate kinds, such as are constituted of fresh maiden earth taken from old pasture ground, of a light but rich mouldy quality inclining to loam. In forming it, the top spit or turf should only be taken; to which should be added a third or fourth part of thoroughly rotten dung, the whole being laid in a long heap or ridge, three feet high, in a situation exposed to the sun and air for several months, and turned over occasionally, that the mass may be converted into mould, and the materials properly incorporated together. Where good pasture earth cannot be procured, a quantity of good garden mould will answer; adding one-third or fourth part of rotten dung, as that of old hot beds; and where the soil is of rather a stiff nature, about a fourth part of sea-sand at the same time, or of ashes, drift, or rotten tan, the whole being thrown up in a heap for five or six months; but the longer the better, it being often stirred up and stirred over.

For plants that require light, loose mould, composts may be formed of one-half good pasture mould, or that of a garden, and about one-third of sand and rotten dung; the whole being formed into a heap in the same way as the preceding.

Where a soft, loose, rich earth is required, composts of good, light, rich garden, or pasture earth, rotten tanner's bark, or rotten earthen wood, sawdust, tree-leaves, rotten dung, and a small portion of sand, may be used after being well blended together.

If dry rubbishy soils be wanted, composts formed of one-half of perfectly light garden or pasture mould, and one-half of sea-sand or road soil, and a little screened lime-rubbish, the whole laid in a heap for some months, and turned over two or three times and well mixed, may be had recourse to.

Where the heavier sorts of composts are wanted, they may be prepared from fresh loamy earth of a common or any dry pasture ground, where the soil is of a soft and moderately friable nature, taking the uppermost spit, sward and all, chopping it to bits, and adding rotten dung as above; which after lying in a ridge or heap twelve or fifteen months in order that the sward may rot, and being frequently turned over, to break the lumps and mix the parts well together, may be made use of with success.

Where the culture of flowers is intended, composts of different sorts may be formed thus:

For auriculas; of light earth from pasture ground, the top-spit with the sward and neat's dung, of each about an equal portion, and about half the quantity of drift or sea-sand, and when it can be had, a little rotten willow earth, or any rotten earthy wood, or old rotten tan or saw dust, the whole formed into a heap for several months, and often turned over. This compost is also appropriate to carnations, ranunculuses, and anemones: which nevertheless often blow well in common, rich, light, garden earth.

For hyacinths, composts formed of neat's dung and drift-sand, each an equal proportion; and half the quantity of old rotten tan, are very useful. When it can be easily procured, the same portion of rotten leaves of trees, or a little more rotten bark, and a proportionate quantity of light earth, from a pasture or a garden may be used; the whole well mixed and frequently turned, to lie together for at least a year.

Composts should always be formed in an open, exposed place, free to the influence of the sun, air, rains, frosts, and showers; and the ingredients should be mixed in heaps extended in length like a ridge, about a yard in thickness, turned over frequently from bottom to top, that every part may equally participate in the changes of the atmosphere.

These composts when used should not be screened, except for some particular purpose as

mentioned above; the best general method being to break them only into a coarse mould with the spade and hands.

Under the article Compost, we ought to mention Mr. Forsyth's celebrated composition for the preservation of fruit and forest trees, for which, upon an examination of its efficacy, May 11, 1791, his majesty granted the inventor a reward, in consequence of his disclosure of the secret. The directions for this composition are as follow:

Take one bushel of fresh cow-dung, half a bushel of lime-rubbish of old buildings (that from the cielings of rooms is preferable), half a bushel of wood-ashes, and a sixteenth part of a bushel of pit or river sand. The three last articles are to be sifted fine before they are mixed; then work them well together with a spade, and afterwards with a wooden beater, until the stuff is very smooth, like fine plaister used for the cielings of rooms.

The composition being thus made, care must be taken to prepare the tree properly for its application, by cutting away all the dead, decayed, and injured part, till you come to the fresh sound wood; leaving the surface of the wood very smooth, and rounding off the edges of the bark with a draw knife, or other instrument, perfectly smooth, which must be particularly attended to; then lay on the plaister, about one-eighth of an inch thick, all over the part where the wood or bark has been so cut away, finishing off the edges as thin as possible. Then take a quantity of dry powder of wood-ashes, mixed with a sixth part of the same quantity of the ashes of burnt bones; put it into a tin-box, with holes in the top, and shake the powder on the surface of the plaister, till the whole is covered over with it, letting it remain for half an hour, to absorb the moisture; then apply more powder, rubbing it on gently with the hand, and repeating the application of the powder, till the whole plaister becomes a dry smooth surface.

All the trees cut down near the ground should have the surface made quite smooth, rounding it off in a small degree, as before mentioned; and the dry powder, directed to be used afterwards, should have an equal quantity of alabaster mixed with it, in order the better to resist the dripping of trees, and heavy rains.

If any of the composition be left for a future occasion, it should be kept in a tub, or other vessel, and urine of any kind poured on it, so as to cover the surface, otherwise the atmosphere will greatly hurt the efficacy of the application. Where lime-rubbish of old buildings cannot be easily got, take powdered chalk or common lime, after having been slaked for at least a month.

This composition should be applied with a painter's brush, being itself of the consistency of paint: and if the tree be hollow, all the rotten, loose, and dead part must be scooped out, down to the solid wood of the trunk, the surface being made smooth.

To Co'mpost. *v. a.* To manure (*Bacon*).

COMPOSTELLA, or St. Iago de Compostella, the capital of Galicia, in Spain. It is the see of an archbishop, and the seat of an university. Here are a great number of monasteries for both sexes. Great quantities of pilgrims resort to the church of St. Iago, to pay their devotions to St. James the Less, whom they imagine to have been buried here. It is 275 miles N.W. of Madrid. Lat. 42. 52 N. Lon. 8. 17 W.

Compostella (New), the principal town of Xalisco, in New Spain, America. It was built in 1531. Lat. 21. 20 N. Lon. 109. 42 W.

COMPO'STURE. *s.* (from *compost.*) Soil; manure: not used (*Shakspeare*).

COMPO'SURE. *s.* (from *compose.*) 1. The act of composing or inditing (*King Charles*). 2. Arrangement; combination; order (*Holder*). 3. The form arising from the disposition of the various parts (*Crashaw*). 4. Frame; make (*Shakspeare*). 5. Adjustment (*Wotton*). 6. Composition; framed discourse (*Atterbury*). 7. Sedateness; calmness; tranquillity (*Milton*). 8. Agreement; composition; settlement of differences (*Milton*).

COMPOTA'TION. *s.* (*compotatio*, Latin.) The act of drinking together (*Philips*).

To COMPO'UND. *v. a.* (*compono*, Latin.) 1. To mingle many ingredients together. 2. To form by uniting various parts (*Boyle*). 3. To mingle in different positions; to combine (*Addison*). 4. To form one word from two or more words; as daylight from day and light (*Raleigh*). 5. To compose by being united (*Shakspeare*). 6. To adjust a difference by some recession from the rigour of claims (*Bacon*). 7. To discharge a debt by paying only part.

To Compo'und. *v. n.* 1. To come to terms of agreement, by abating something of the first demand (*Dryden*). 2. To bargain in the lump (*Shakspeare*). 3. To come to terms, by granting something on each side (*Carew*). 4. To determine: not in use (*Shakspeare*).

Co'mpound. *a.* (from the verb.) 1. Formed out of many ingredients; not simple (*Bacon*). 2. Composed of two or more words (*Pope*).

Compound. (*compositus.*) In botany. Stem, dividing into branches; leaf, connecting several leaflets on one petiole, which in this case is called a common petiole; flower, a species of aggregate flower, containing several florets, enclosed in a common perianth, and on a common receptacle; with the anthers connected in a cylinder; as in the class syngenesia; raceme, composed of several racemules, or small racemes; spike, composed of several spicules or spikelets; corymb, formed of several small corymbs; umbel, having all the rays or peduncles bearing umbellules, or small umbels, at the top; fructification, consisting of several confluent florets; opposed to simple.

Compound numbers. See Composite.

Compound interest. See Interest.

Compound proportion. See Arithmetic.

Compound quantities, in algebra,

such as are composed of terms joined by the signs + or —. Thus $2a+b-c$, and $x^2+2xy+y^2$, are compound quantities.

COMPOUND, or COMPOUNDED RATIO. See COMPOSITION OF RATIOS.

CO'MPOUND. *s.* The mass formed by the union of many ingredients (*South*).

COMPO'UNDABLE. *a.* Capable of being compounded.

COMPO'UNDER. *s.* (from *to compound.*) 1. One who endeavours to bring parties to terms of agreement (*Swift*). 2. A mingler; one who mixes bodies.

To COMPREHE'ND. *v. a.* (*comprehendo*, Lat.) 1. To comprise; to include (*Dryden*). 2. To contain in the mind; to conceive; to understand (*Waller*).

COMPREHE'NSIBLE. *a.* (*comprehensible*, Fr.) 1. Intelligible; conceivable (*Locke*). 2. Possible to be comprised (*Bacon*).

COMPREHE'NSIBLY. *ad.* With great power of signification or understanding; with great extent of sense.

COMPREHE'NSION. *s.* (*comprehensio*, Lat.) 1. The act or quality of comprising or containing; inclusion (*Hooker*). 2. Summary; epitome; compendium (*Rogers*). 3. Knowledge; capacity; power of the mind to admit many ideas at once (*Dryden*).

COMPREHENSION, in English church-history, denotes a scheme proposed by sir Orlando Bridgman in 1667-8, for relaxing the terms of conformity in behalf of protestant dissenters, and admitting them into the communion of the church. A bill for this purpose was drawn up by lord chief-baron Hale, but disallowed. The attempt was renewed by Tillotson and Stillingfleet in 1674, and the terms were settled to the satisfaction of the nonconformists; but the bishops refused their assent. This scheme was likewise revived again immediately after the Revolution; the king and queen expressed their desire of an union: however, the design failed after two attempts; and the act of toleration was obtained.

COMPREHENSION, in metaphysics, is that act of the mind whereby it apprehends or knows any object that is presented to it, on all the sides whereon it is capable of being apprehended or known. To comprehend a thing is defined by the schoolmen, *rem aliquam totam et totaliter cognoscere*.

COMPREHENSION, in rhetoric, a trope or figure whereby the name of a whole is put for a part; or that of a part for a whole; or a definite number of any thing for an indefinite.

COMPREHE'NSIVE. *a.* (from *comprehend.*) 1. Having the power to comprehend or understand many things at once (*Pope*). 2. Having the quality of comprising much; compendious; extensive (*Sprat*).

COMPREHE'NSIVELY. *ad.* In a comprehensive manner.

COMPREHE'NSIVENESS. *s.* The quality of including much in a few words or narrow compass (*Addison*).

To COMPRE'SS. *v. a.* (*compressus*, Lat.) 1. To force into a narrow compass. 2. To embrace (*Pope*).

COMPRESS, in surgery, a bolster of soft linen cloth, folded in several doubles, frequently applied to cover a plaster, in order not only to preserve the part from the external air, but also the better to retain the dressings, or medicines. See SURGERY.

COMPRESSED, or FLATTED. (*compressus.*) In botany. Applied to a stem, which has the two opposite sides plane or flat; to a leaf, which is pulpy, with the sides more flatted than the disk. Opposed to depressed. Applied to a silique which has the opposite sides approaching to each other.

COMPRESSIBI'LITY. *s.* (from *compressible.*) The quality of admitting to be brought by force into a narrower compass.

COMPRE'SSIBLE. *a.* (from *compress.*) Yielding to pressure, so as that one part is brought nearer to another (*Cheyne*).

COMPRE'SSIBLENESS. *s.* (from *compressible.*) Capability of being pressed close.

COMPRE'SSION. *s.* (*compressio*, Latin.) The act of bringing the parts of any body nearer to each other by violence (*Bacon. Newton*).

COMPRESSION. (*compressio*, from *comprimo*, to press together.) By this term surgeons express a diseased state of the body, which is the effect of something pressing upon the brain. It should be distinguished from concussion and inflammation. When the brain is compressed either by bone, extravasated blood, or any other fluid, there is giddiness, nausea, vomiting, loss of sense and voluntary motion; coma and stupor, with a paralysis of some part or other; a sturtorose breathing, and convulsive twitches. The pulse is in general oppressed and irregular.

COMPRESSION OF THE TERRESTRIAL SPHEROID, is used to express the difference between the major and minor axes of the earth, in terms of the former. See ELLIPTICITY.

COMPRESSOR NARIS. (*compressor*, from *comprimo*, to press together.) Rhinæus vel nasalis of Douglas. A muscle of the nose, that compresses the alæ towards the septum nasi, particularly when we want to smell acutely. It also corrugates the nose, and assists in expressing certain passions. It arises, by a narrow beginning, from the root of the ala nasi externally, and spreads into a number of thin, separate fibres, which run up along the cartilage in an oblique manner towards the back of the nose, where it joins with its fellow, and is inserted into the narrow extremity of the os nasi and nasal process of the superior maxillary bone.

COMPRE'SSURE. *s.* (from *compress.*) The act or force of the body pressing against another (*Boyle*).

To COMPRI'NT. *v. n.* (*comprimere*, Lat.) To print another's copy, to the prejudice of the rightful proprietor (*Phillips*).

To COMPRI'SE. *v. a.* (*compris*, Fr.) To contain; to comprehend; to include (*Roscom.*).

COMPROBA'TION. *s.* (*comprobo*, Lat.) Proof; attestation (*Brown*).

COMPROMISE. *s.* (*compromissum*, Lat.) 1. A mutual promise of parties at difference to refer the ending of their controversies to arbitrators (*Cowell*). 2. A compact or bargain in which concessions are made on each side (*Shakspeare*).

To Co'mpromise. *v. a.* (from the noun.) 1. To compound; to adjust a compact by mutual concessions. 2. To accord; to agree (*Shakspeare*).

COMPROMISSO'RIAL. *a.* (from *compromise.*) Relating to a compromise.

COMPROVI'NCIAL. *a.* (*con* and *provincial.*) Belonging to the same province (*Ayliffe*).

COMPT. *s* (*compte*, Fr.) Account; computation; reckoning (*Shakspeare*).

To Compt. *v. a.* (*compter*, Fr.) To compute; to number. We now use *To* Count.

CO'MPTIBLE. *a.* Accountable; ready to give account (*Shakspeare*).

COMPTING, or Counting house, a room with desks, &c. fitted up for the reception of clerks and accountants, of merchants, bankers, &c.

COMPTORIA. In botany, a genus of the class monoecia, order triandria. Male ament cylindrical, imbricate; calyx six leaved; corolless; styles two; nut ovate. One species only: a North American plant, with slender, shrubby, hairy stalks: lateral erect aments.

To COMPTRO'LL. *v. a.* (properly *control.*) To control; to overrule; to oppose.

COMPTRO'LLER. *s.* (from *comptroll.*) Director; supervisor (*Temple*). See Controller.

COMPTRO'LLERSHIP. *s.* (from *comptroller.*) Superintendance (*Carew*).

COMPU'LSATIVELY. *ad.* By constraint; with force.

COMPU'LSATORY. *a.* (from *compulsor*, Latin.) Having the force of compelling (*Shakspeare*).

COMPU'LSION. *s.* (*compulsio*, Latin.) 1. The act of compelling to something; force; violence of the agent (*Milton*). 2. The state of being compelled (*Hale*).

COMPU'LSIVE. *a.* (from *compulser*, Fr.) Having the power to compel; forcible (*Swift*).

COMPU'LSIVELY. *ad.* (from *compulsive.*) By force; by violence.

COMPU'LSIVENESS, *s.* Force; compulsion.

COMPULSOR, an officer under the Roman emperors, dispatched from court into the provinces, to compel the payment of taxes, &c. not paid within the time prescribed.

COMPU'LSORILY. *ad.* (from *compulsory.*) In a forcible manner; by violence (*Bacon*).

COMPU'LSORY. *a.* (*compulsoire*, Fr,) Having the power of compelling (*Bramhall*).

COMPU'NCTION. *s.* (*componction*, Fr,) 1. The power of pricking; stimulation; irritation (*Brown*). 2. The state of being pricked by the conscience; repentance; contrition (*Clarendon*).

COMPU'NCTIOUS. *a.* (from *compunction.*) Repentant; sorrowful; tender (*Shakspeare*).

COMPU'NCTIVE. *a.* (from *compunction.*) Causing remorse.

COMPURGA'TION. *s.* (*compurgatio*, Latin.) The practice of justifying any man's veracity by the testimony of another.

COMPURGA'TOR. *s.* (Latin.) One who bears his testimony to the credibility of another (*Woodward*).

COMPU'TABLE. *a.* (from *compute.*) Capable of being numbered (*Hale*).

COMPUTA'TION. *s.* (from *compute.*) 1. The act of reckoning; calculation (*Shak.*). 2. The sum collected or settled by calculation (*Addison*).

To COMPU'TE. *v. a.* (*computo*, Lat.) To reckon; to calculate; to count (*Holder*).

Compu'te. *s.* (*computus*, Latin.) Computation; calculation (*Brown*).

COMPU'TER. *s.* (from *compute.*) Reckoner; accountant; calculator (*Swift*).

CO'MPUTIST. *s.* (*computiste*, Fr.) Calculator; one skilled in computation (*Wotton*).

CO'MRADE. *s.* (*camerade*, French.) 1. One who dwells in the same house or chamber (*Shakspeare*). 2. A companion; a partner (*Milton*).

COMUS, the god of revelry, feasting, and nocturnal entertainments. During his festivals, men and women exchanged each other's dress. He was represented as a young and drunken man, with a garland of flowers on his head, and a torch in his hand, which seemed falling.

CON, an Italian preposition, signifying *with*, and used by musical writers: as *con ario*, with the bow; *con affetto*, with tenderness.

Con. A Latin inseparable preposition, which at the beginning of words signifies union: as, *concourse*, a running together.

Con. (from *contra*, against, Latin.) A cant word for the negative side of a question; as, the *pros* and *cons*.

To Con. *v. a.* (connan, Saxon.) 1. To know (*Spenser*). 2. To study; to commit to memory (*Arbuthnot*). 3. *To* Con *thanks*. To thank (*Shakspeare*).

CONANA, in ancient geography, an episcopal town of Asia, in Pamphylia.

CONARIUM. (*conarium*, κωναριον; from κωνος, a cone). The pineal gland is so named, from its conical shape. See Pineal gland.

CONATUS, (*endeavour*, *tendency*,) a term frequently used in philosophy and mathematics, defined by some to be a quantity of motion, not capable of being expressed by any line or length; as the *conatus recedendi ab axe motus*, is the endeavour which a body, moved circularly, makes to recede, or fly off from the centre or axis of its motion.

CONCALE BAY, is on the coast of France, and former province of Brittany. The town which gives name to the bay is in Lat. 48. 41 N. Lon. 7. 30 W.

To CONCA'MERATE. *v. a.* (*concamero*, Latin.) To arch over; to vault (*Grew*),

CONCAMERA'TION. *s.* (from *concamerate.*) Arch; vault (*Glanville*).

CONCAN, a low tract of country, on the W. coast of the Deccan of Hindustan. It is subject to the Mahrattas, and lies between 15 and 20 N. Lat.

To CONCA'TENATE. *v. a.* (from *catena*, Latin.) To link together.

CONCATENA'TION. *s.* (from *concatenate.*) A series of links; an uninterrupted unvariable succession (*South*).

CONCAVA'TION. *s.* (from *concave.*) The act of making concave.

CO'NCAVE. *a.* (*concavus*, Lat.) Hollow without angles; opposed to *convex* (*Burnet*).

CONCAVE LENS, &c. See LENS, MIRROR, CATOPTRICS, and DIOPTRICS.

CONCAVE LEAF. In botany. When the edge stands above the disk; or, as Linnéus expresses it, when the margin of the leaf being too tight to circumscribe the disk, the disk is depressed. Applied also to the calyx and corol; and to the valves of the glume in grasses.

CONCA'VENESS. *s.* Hollowness.

CONCA'VITY. *s.* (from *concave.*) Internal surface of a hollow spherical body (*Woodward*).

CONCA'VO-CONCAVE. *a.* Concave, or hollow on both sides.

CONCA'VO-CONVEX. *a.* (from *concave* and *convex.*) Concave one way, and convex the other (*Newton*).

CONCA'VOUS. *a.* (*concavus*, Latin.) Concave.

CONCA'VOUSLY. *ad.* (from *concavous.*) With hollowness (*Brown*).

To CONC'EAL. *v. a.* (*concelo*, Latin.) To hide; to keep secret; to cover (*Pope*).

CONCE'ALABLE. *a.* (from *conceal.*) Capable of being concealed (*Brown*).

CONCE'ALEDNESS. *s.* (from *conceal.*) Privacy; obscurity.

CONCE'ALER. *s.* (from *conceal.*) He that conceals any thing (*Clarendon*).

CONCE'ALMENT. *s.* (from *conceal.*) 1. The act of hiding; secrecy (*Glanville*). 2. The state of being hid; privacy (*Addison*). 3. Hiding-place; retreat; cover (*Rogers*).

CONCEALMENT OF TREASON. See MISPRISION.

To CONCE'DE. *v. a.* (*concedo*, Latin.) To yield; to admit; to grant (*Bentley*).

CONCE'IT. *s.* (*concept*, French.) 1. Conception; thought; idea (*Sidney*). 2. Understanding; readiness of apprehension (*Wisdom*). 3. Opinion; fancy; imagination (*Locke*). 4. Pleasant fancy; acuteness (*Shakspeare*). 5. Sentiment; striking thought (*Pope*). 6. Fondness; favourable opinion (*Bentley*). 7. *Out of* CONCEIT *with.* No longer fond of (*Tillotson*).

To CONCE'IT. *v. a.* To conceive; to imagine; to believe (*South*).

CONCE'ITED. *participial a.* 1. Endowed with fancy (*Knolles*). 2. Proud; fond of himself; opinionative; fantastical (*Felton*).

CONCE'ITEDLY. *ad.* (from *conceited.*) Fancifully; whimsically (*Donne*).

CONCE'ITEDNESS. *s.* (from *conceit.*) Pride; fondness of himself (*Collier*).

CONCE'ITLESS. *a.* (from *conceit.*) Stupid; without thought (*Shakspeare*).

CONCE'IVABLE. *a.* (from *conceive.*) 1. That may be imagined or thought (*Wilkins*). 2. That may be understood or believed (*Atterbury*).

CONCE'IVABLENESS. *s.* (from *conceivable.*) The quality of being conceivable.

CONCE'IVABLY. *ad.* (from *conceivable.*) In a conceivable or intelligent manner.

To CONCE'IVE. *v. a.* (*concevoir*, French.) 1. To admit into the womb; to form in the womb (*Psalms*). 2. To form in the mind; to imagine (*Jeremiah*). 3. To comprehend; to understand (*Shakspeare*). 4. To think; to be of opinion (*Swift*).

To CONCE'IVE. *v. n.* 1. To think; to have an idea of (*Watts*). 2. To become pregnant (*Genesis*).

CONCE'IVER. *s.* (from *conceive.*) One that understands or comprehends (*Brown*).

CONCE'NT. *s.* (*concentus*, Latin.) 1. Concert of voices; harmony (*Bacon*). 2. Consistency (*Atterbury*).

To CONCE'NTRATE. *v. a.* (*concentrer*, French.) To drive into a narrow compass (*Arbuthnot*).

CONCENTRA'TION. *s.* (from *concentrate.*) Collection into a narrow space round the centre (*Peacham*).

CONCENTRATION. In medicine. (from *con*, and *centrum*, having the same centre.) The volatilizing of part of the water of fluids in order to improve their strength. The matter to be concentrated, therefore, must be of superior gravity to water. This operation is performed on some acids, particularly the sulphuric and phosphoric. It is also employed in solutions of alkalis and neutral salts.

CONCENTRATION, in chemistry, a process employed to change the form of aggregation, either by lessening the quantity of diluting fluids, which is called dephlegmation; or as a preliminary step to one of the modes by which crystallization is produced: for which see CRYSTALLOGRAPHY.

To CONCE'NTRE. *v. n.* (*concentrer*, Fr.) To tend to one common centre (*Hale*).

To CONCE'NTRE. *v. a.* To direct or contract toward one centre (*Milton*).

CONCE'NTRICAL. CONCE'NTRICK. *a.* (*concentricus*, Latin.) Having one common centre (*Arbuthnot. Bentley*).

CONCEPTACLE, or FOLLICLE. In botany, (*conceptaculum, folliculus*). A pericarp of one valve, opening longitudinally on one side, and having the seeds loose in it. As in apocynum, asclepias, stapelia.

CONCE'PTIBLE. *a.* (from *conceptum*, Latin.) Intelligible; capable to be understood (*Hale*).

CONCE'PTION. *s.* (*conceptio*, Latin.) 1. the act of conceiving, or quickening with pregnancy (*Milton*). 2. The state of being conceived (*Shaks.*). 3. Notion; idea (*South*). 4. Sentiments; purpose (*Shakspeare*). 5. Ap-

prehension; knowledge (*Davies*). 6. Conceit; sentiment; pointed thought (*Dryden*).

Conception, (*conceptio*, from *concipio*, to conceive). According to the more common theory, the impregnation of the ovulum in the female ovarium by the subtile prolific aura of the semen virile. In order to have a fruitful coition it is necessary that the semen be propelled into the uterus or vagina, so that its fecundating vapour should be conveyed through the Fallopian tubes to the ovarium: hence it is necessary that there be a certain state of the ovarium of the female in order to impregnate it; which is, that the ovum shall be mature, and embraced by the fimbriæ of the Fallopian tube to convey that vivifying principle to the ovum. For other theories, see the article Generation.

Conception (Immaculate), a festival in the Romish church, observed on the 8th of December, in commemoration of the holy Virgin's having been conceived and born immaculate, or without original sin. The immaculate conception of the Virgin, though reckoned a pious opinion, is not an article of faith in the Romish church.

Conception of our lady, a religious order in Portugal, founded in the fifteenth century. This order has since passed into Italy, and got footing in Rome and Milan.

Conception, in logic, the simple apprehension, or perception, which we have of any thing, without proceeding to affirm, or deny, any thing about it.

Some writers distinguish between conception and perception; making the latter to denote the consciousness of an object when present, or to include the reality of its object; whereas conception expresses the forming an idea of an object whether present or absent, or without any conviction of its reality. See lord Kaimes's El. Criticism, vol. ii. p. 508.

Professor Dugald Stewart defines conception, that power of the mind, which enables it to form a notion of an absent object of perception; or of a sensation which it has formerly felt. Its province, as distinguished from imagination, is to present us with an exact transcript of what we have formerly felt and perceived; while that of imagination is, to make a selection of qualities and circumstances from a variety of different objects, and by combining and disposing these, to form a new creation of its own.

Conception, an episcopal town of Chili, in South America. It has been several times taken and retaken by the natives and the Spaniards. Lat. 36. 43 S. Lon. 72. 35 W.

Conception, a town of New Spain, in North America, 100 miles W. of Porto Bello. Lat. 10. 0 N. Lon. 81. 45 W.

CONCE'PTIOUS. *a.* (*conceptum*, Latin.) Apt to conceive; pregnant (*Shakspeare*).

CONCE'PTIVE. *a.* (*conceptum*, Latin.) Capable to conceive (*Brown*).

CONCEPTUALISTS, in logic and metaphysics, a denomination given to a party who took a middle road between the two sects of nominalists and realists, into which the scholastic philosophers were divided from the beginning of the twelfth century. They differed from the nominalists about the necessity of language as an instrument of thought, in carrying on our general speculations. See Reid on the Intellectual Powers of Man, and Stewart's Philosophy of the Human Mind.

To CONCE'RN. *v. a.* (*concerner*, French.) 1. To relate to; to belong to (*Locke*). 2. To affect with some passion (*Rogers*). 3. To interest; to engage by interest (*Boyle*). 4. To disturb; to make uneasy (*Derham*). 5. *To concern himself.* To intermeddle; to be busy (*Dryden*).

Conce'rn. *s.* (from the verb.) 1. Business; affair (*Rogers*). 2. Interest; engagement (*Burnet*). 3. Importance; moment (*Roscommon*). 4. Passion; affection; regard (*Addison*).

CONCE'RNEDLY. *ad.* (from *concern.*) With affection; with interest (*Clarendon*).

CONCE'RNING. *prep.* Relating to; with relation to (*Bacon. Tillotson*).

CONCE'RNMENT. *s.* (from *concern.*) 1. The thing in which we are concerned or interested; business; interest (*Tillotson*). 2. Relation; influence (*Denham*). 3. Intercourse; business (*Locke*). 4. Importance; moment (*Boyle*). 5. Interposition; regard; meddling (*Clarendon*). 6. Passion; emotion of mind (*Dryden*).

To CONCE'RT. *v. a.* (*concerter*, French.) 1. To settle any thing in private by mutual communication. 2. To settle; to contrive; to adjust (*Rowe*).

Co'ncert. *s.* (from the verb.) 1. Communication of designs (*Swift*). 2. A symphony; many performers playing to the same tune.

Concert, A musical performance in which any number of practical musicians, either vocal or instrumental, or both, unite in the exercise of their respective talents.

Concert pitch, implies that particular position of tone as to gravity or acuteness, to which all musical instruments are adjusted, before they can be used in concert, so as to play in tune. There are various methods of ascertaining the tone of any given instrument when it corresponds with the concert pitch: we shall mention one or two.

1. By the late Dr. Robison. Let a machine consisting of a combination of wheel-work be so regulated by the motion of a fly, that 2400 of the teeth shall strike a quill projecting against them, during ten seconds of time; then will the sound produced by the snaps of the quill against the teeth, be in exact unison with the note C-*sol-fa-ut*, or the C corresponding with the cliff of the tenor.

2. By the same philosopher. Let there be an apparatus regulated by wheel-work which shall open and shut the passage to an even current of air produced by a pair of bellows (such as are used in organs) 240 times in a second, then will these rapid alternate openings and shuttings of the cock give a clear

musical sound in unison with the same note C.

For other methods we must refer to Atwood on Motion; Smith's Harmonics; and Gregory's Translation of Haüy's Natural Philosophy, vol. i.

CONCERTANTE, in music, according to Grassineau, signify those parts which are sung or played through the whole piece.

CONCERTA'TION. *s.* (*concertatio*, Lat.) Strife; contention.

CONCE'RTATIVE. *a.* (*concertativus*, Latin.) Contentious; quarrelsome.

CONCERTATO, intimates the piece of music to be composed in such a manner, as that all the parts may have their recitativos, be it for two, three, four, or more voices or instruments.

CONCERTINO. (Ital.) The principal instruments in a concerto or concertante; as oboe concertino, the principal hautboy.

CONCERTO GROSSI, the grand chorus of a concert, or those places where all the several parts perform or play together.

CONCE'SSION. *s.* (*concessio*, Latin.) 1. The act of granting or yielding (*Hale*). 2. A grant; the thing yielded (*K. Charles*).

CONCESSION, in rhetoric, a figure, whereby something is freely allowed, that yet might bear dispute, to obtain something that one would have granted to him, and which he thinks cannot fairly be denied; as in the following concession of Dido, in Virgil:

"The nuptials he disclaims, I urge no more;
Let him pursue the promis'd Latian shore.
A short delay is all I ask him now;
A pause of grief, an interval from woe."

Or, as in this: "True, she is fair; but ought to shew her acknowledgments to heaven for the favour by making a virtuous use of her beauty."

CONCE'SSIONARY. *a.* (from *concession.*) Given by indulgence or allowance.

CONCE'SSIVELY. *ad.* (from *concession.*) By way of concession (*Brown*).

CONCH. *s.* (*concha*, Latin.) A shell; a sea-shell (*Dryden*).

CONCHA, in antiquity, a liquid measure among the Athenians.

According to Galen, in his work De Ponderibus et Mensuris, cap. xi. the concha magna contained the same quantity with the acetabulum, which in liquid measure was an ounce and a half, and in weight fifteen drams. The concha minor was in liquid measure half an ounce, and in weight five drams.

CONCHA, (*concha*, κογχη, a liquid measure among the Athenians). A term applied by anatomists to several parts of the body, as the hollow of the ear, the spongy bones of the nose, &c.

CONCHA AURIS. The hollow part of the cartilage of the outer ear.

CONCHÆ NARIUM. (*concha*, a shell.) The turbinated portion of the ethmoid bone and the inferior spongy bones of the nose, which are covered by the Schneiderian membrane, are so termed.

CONCHIUM. In botany, a genus of the class tetrandria, order monogynia. Calyxless; petals four, supporting the stamens; stigma turbinate, mucronate; capsule one-celled, two-seeded; seeds winged. One species only: a rigid Australasian shrub, with oblique capsules, and white flowers.

CONCHOID, or CONCHILES, the name of a curve invented by Nicomedes. It was much used by the ancients in the construction of solid problems.

It is thus constructed: AP and BD being two lines intersecting at right angles; from P draw a number of other lines PFDE, &c. on which take always DE=DF=AB or BC; so shall the curve line drawn through all the points E, E, E, be the first conchoid, or that of Nicomedes; and the curve drawn through all the other points F, F, F, is called the second conchoid; though, in reality, they are both but parts of the same curve, having the same pole P, and four infinite legs, to which the line DBD is a common asymptote. Pl. 48. figs. 3, 4, 5.

The inventor, Nicomedes, contrived an instrument for describing his conchoid by a mechanical motion; which is described in our treatise on ARCHITECTURE.

To determine the equation of the curve; put AB=BC=DE=DF=a, PB=b, BG=EH=x, and GE=BH=y; then the equation to the first conchoid will be

$x^2 \times \overline{b+x}^2 + x^2y^2 = a^2 \times \overline{b+x}^2$, or

$x^4 + 2bx^3 + b^2x^2 + x^2y^2 = a^2b^2 + 2a^2bx + a^2x^2$;

and, changing only the sign of x, as being negative in the other curve, the equation to the second conchoid will be

$x^2 \times \overline{b-x}^2 \times x^2y^2 = a^2 \times \overline{b-x}^2$, or

$x^4 - 2bx^3 + b^2x^2 + x^2y^2 = a^2b^2 - 2a^2bx + a^2x^2$.

Of the whole conchoid, expressed by these two equations, or rather one equation only, with different signs, there are three cases or species; as first,

when BC is less than BP, the conchoid will be as in fig. 3;

when BC is equal to BP, the conchoid will be as in fig. 4;

and when BC is greater than BP, the conchoid will be as in fig. 5.

Newton approves of the use of the conchoid for trisecting angles, or finding two mean proportionals, or for constructing other solid problems.

The equation to this curve may, however, be expressed far more simply than above. For, if in addition to the preceding notation we put the variable angle BPD=φ, and the variable line PE or PF=z, we shall have PD=$\frac{PB}{\cos.\ \varphi} = \frac{b}{\cos.\ \varphi}$, and consequently PE=$\frac{b}{\cos.\ \varphi} + a$, while PF=$\frac{b}{\cos.\ \varphi} - a$; or, generally, $z = \frac{b}{\cos.\ \varphi} \pm a$.

CONCHOLOGY. (from κογχος, a shell, and λογος, a doctrine, or discourse.) The doctrine of shells: and hence, properly speaking, a branch of zoology. But as this last is rather devoted to a consideration of the animal that inhabits the various orders of shells we meet with, than the house or habitation itself; and as the character of shells cannot conveniently be made to enter into a zoological arrangement; it is upon the whole better to separate the branch of conchology from the general science of zoology, and to treat of it under a distinct article.

Many attempts have been made to arrange this study into a systematic form; a study pursued from a very early period of time, though greatly improved by the application of chemistry to its elucidation in our own æra. In Aldrovand, Gesner, and Fabius Columna, we have all that the ancients have said on the subject. The first writer among the moderns who treated on it professedly is Buonanni, who printed an Italian work, entitled Recreazione dell' Occhio, at Rome, in 1681, a Latin version of which was given by himself in 1684. It is to J. Daniel Major, however, a physician of Kiel, in Holstein, that we are indebted for the first attempt towards a methodical arrangement, which he published in his edition of Columna's Opusculum de Purpura, with annotations in 1675. The subject, nevertheless, was pursued with still greater success by Dr. Lister, to whose Historia Animalium Angliæ, published in 1678, succeeded his very valuable Historia Conchyliorum, published in successive parts in folio, between 1685 and 1692. In this elaborate work, he divides the different kinds of shells into four classes: the first including terrestrial shells of all kinds; the second fresh-water shells, both turbinate and bivalved; the third and fourth devoted to sea-shells, the former of these two classes being confined to the bivalved and multivalved; and the latter to the turbinate.

Rumphius, in his Rarity Chamber of Amboyna, fol. printed first in Dutch, at Amsterdam, in 1705, again in 1711, and again in 1745; and printed in German, at Vienna, in 1766, adopts the three divisions of the simple and turbinated univalves, and the bivalves; blending the multivalves with the other divisions.

Langius, a physician of Lucerne, in Switzerland, published in 1722, a new and easy method of shells, disposed in classes, genera, and species. He follows the general distribution of Rumphius.

The next writer of any note, not to mention Breynius, de Polythalamis, printed at Dantzick, in 1732, nor Plancus, de Conchis Ariminensibus minus notis, printed at Venice, in 1739, is M. d'Argenville, who published la Conchyliologie, at Paris, in 1742, and again in 1757. This author has prefixed a preliminary discourse on the formation of shells, the different methods of arrangement, the manner of cleaning them, and their uses; and also on fossil shells, and their origin; and an account of the principal musea of natural history now in being. The other part of his work contains a history of shells, ranged in their respective classes, with proper tables, characters, indexes, and remarks: the whole illustrated by a number of plates.

M. d'Argenville throws aside the arrangement of Lister into terrestrial, fresh-water, and sea-shells, founded on their respective habitations, and rests his classical character on the simplicity or elaboration of their form: whence he divides them into the three classes of univalves, as the cochleæ; bivalves, as oysters; and multivalves, as the pholas and balanus.

Davila, in his Catalogue Systematique et Raisonné de Curiosités, printed at Paris, in 1767, thought proper to follow this system of d'Argenville, and immediately afterwards Linnéus admitted it into his Systema Naturæ; on which account it has been the arrangement almost uniformly adhered to by later naturalists. The Swedish zoologist, however, inverted the order of d'Argenville, making the multivalves his first class, the bivalves his second, and the univalves his third. We are not acquainted with his motives for this change; the original plan appears to be the best, because the simplest, and we shall therefore adhere to it in the present article. We shall only observe, that under the Linnéan arrangement, the multivalves contain the chiton, lepas, and pholas; the bivalves, mya, solen, tellina, cardium, mactra, donax, venus, spondylus, chama, arca, ostrea, anomia, mytilus, and pinna; and the univalves, argonauta, nautilus, conus, cypræa, bulla, voluta, buccinum, strombus, murex, trochus, turbo, helix, nerita, haliotis, patella, dentalium, serpula, teredo, and sabella, which see.

Univalves. In the examination of a shell of this order, the contour, or outline, is the first particular to be regarded. By this the conchologist is guided in his definition of simple, spiral, or turbinated shells, (or as the Linnéan school divides shells, univalves with a regular spire, and univalves without a regular spire); discoid, flattened, or turreted shells; those with smooth or uneven anfractus; the ventricose, alated, labiated, rostrated, and many other distinctions, all which strike the eye at the first view. It is indeed, by attending to the contour, that the principal distinctions in shells of this kind are at once perceived, taking into consideration the back and front profile at the same time. Some few shells, as the nautilus pompilius, and others of the same family, have the spire revolving internally, in which the outline offers less assistance in the primary definitions, but the number of such shells is very small. Next to the profile of the shell, the structure of the mouth, the pillar, and expansion of the inner lip, the gutter or canaliculation, and the umbilical opening, and operculum, if any, are to be considered, and, lastly, the work on the outer surface, as well as the colours with which it is embellished.

The base or bottom of the shell we consider that part upon which it rests when supported in an erect position, with the summit or tip of the spire standing vertically. In such shells the tip is called the apex. The course of the spires or wreaths is from the left to right in most spiral shells, some few only being of the reversed or heterostrophous kind, the whorls of which are in a contrary direction. When speaking of the right and left sides of a shell, it should be understood as having the aperture downwards, and it will be then seen that in most shells the aperture or opening is on the left side, i. e. facing the right hand of the spectator.

Bivalves. These are shells of two valves or pieces, united by means of a cartilage, hinge, connection of the teeth, or other process. In order to constitute a bivalve shell, it is only requisite that it be furnished with two connected valves, without regard to their resemblance in form or dimensions. Some of the bivalves have both valves formed alike; in others they differ only in a slight degree, and again in others they are al-

together dissimilar. The first of these is well exemplified by the solen genus; in that of the Linnéan tellinæ, we find examples both of the equivalve shells, and those with the valves slightly different: of the last-mentioned kinds we have many, as the ostrea, spondylus, and anomia. Bivalve shells are often much compressed, some are gibbous, and when viewed at the side, or facing the ligament, have a cordated appearance, as in the venus, and the Linnéan chama cor. Shells, having both valves alike, as before observed, are called equivalve. Equilateral valves imply those which have both sides of the same valve alike; as for instance, when a longitudinal line is drawn from the beak to the opposite margin, the space on each side of the line is distinguished by the appellation of the right and left side; and when the form of both those spaces correspond, the shell is equilateral, as in the scallops (ostrea, Linn.): the inequilateral valves are the reverse of this, a line drawn as above described, from the beak to the opposite margin, presenting two sides of a very different shape, as we see in most of the mactra, the donax, and tellina genera, and in the mya truncata especially. Subequilateral shells, or those having the valves nearly equal at both sides, are sufficiently elucidated by shells of the cardium, or cockle genus, which are strictly bivalvis subæquilatera.

All bivalve shells do not completely close their shells, though most of those before mentioned do so, such as the scallop, the donax, tellina, and cardium: in several other tribes of bivalves, when the shells are shut as closely as their form will allow, they still exhibit a kind of hiatus or gaping, either at the anterior or posterior end, or at both; and in some, when the valves are shut, both the anterior and posterior parts are closed, but an opening appears on one side of the beak; this last-mentioned character is very obvious in chama gigas.

One of the first circumstances to be considered, is, which part of a bivalve shell ought to be deemed the base, because when this is determined, every other part will fall progressively in their relative order under our observation. We name that part of the margin or limb which is situated in a direct line opposite the beak, the base of the shell. Linnéus, in order to establish the characters, and afford some apparent reason at least for the application of the terms he bestows on the different parts of bivalves, reverses this position of the shell, and describes the beaks as the base of the shell. But the fact is, the natural position of the shell is in immediate contradiction to his axiom, for the beaks are always uppermost, being either immediately vertical, or with a slight inclination obliquely, when the animal moves along with its testaceous covering on the back. A solitary example will perhaps occur occasionally, in which the beaks may be considerably inclined when the animal crawls, but none, we believe, are known which open the valves upwards, and proceed with the beaks under the body. The beaks, if only for this reason, are to be considered as the summit, and the margin opposite as the base. Many of the bivalves are destitute of the locomotive power, or at least do not possess it in any material degree.

Multivalves. The shells of this order are few, compared with either of the preceding; and the terms proposed for those are applicable for the most part to the multivalves. The following require more explicit mention. Base, that part of the shell upon which it rests: in the lepas tribe, it implies the part immediately seated upon the stem or pedicle: in the balani the base is generally larger than the summit, and is the bottom by means of which the shell is fixed upon the rocks or other extraneous bodies. Ligament, the substance, whether membranaceous or tendinous, which serves to connect the valves together. The connexion of the valves in some multivalves is formed by the parts of one valve locking into another. Operculum. The balani have the aperture at the summit closed by means of four small pieces or valves, which are commonly called the operculnm; these opercula of the balani are, however, very different from those of univalve shells.

The classification we have thus far given is invented for the naturalist. We have already mentioned, however, that the science of conchology has of late years been much indebted to chemistry, and occupied much of the chemist's attention. Yet it is clear that such a division can be of little or no use to the chemist, and hence chemical conchology is studied under another arrangement; and comprises in its pursuits, the shells of eggs, as well as those of animals, which may be said to constitute the classes of this science as a chemical study; while this latter may be divided into porcelain-shells, pearl, or nacre-shells, and crustaceous coverings, as its orders.

Shells, regarded in a chemical view, appear to be of a much less compact texture than the bony and horny parts, and want not only the hardness of one, but the flexibility of the other; they are much more brittle, and are easily reduced to a powder.

Egg-Shells.

Although all eggs produced by birds are provided with a shell, it has been observed that very fat hens will sometimes lay them deprived of this hard covering; but the reason of this exception is unknown. The shell is composed of gelatin, phosphat, and carbonat of lime; it has, however, been supposed, that the phosphoric acid arises from the gelatinous matter, and is not united with the earth, as in bones; the truth of which future experience is to determine.

Wasserberg observed that, on using the vitriolic acid as a menstruum, there arose a smell of sulphur. Vauquelin found that nine eggs weighed, according to the new weights, 44,796 gramms, which, divided by 9 = 4,997 for each shell. Thus a hen which has laid 90 eggs in four months and a half, must have formed in that time 447,959 gramms of carbonat of lime, excepting the deduction of the gluten which unites the calcerous parts. These 44,796 gramms of egg-shells, calcined to blackness, lost 8,321 gramms; the residuum dissolved in the nitric acid with great effervescence, and with an odour of sulphureous hydrogen, there remained 0,217 gramms of coal. The nitric solution was white; having boiled it a sufficient time to deprive it of the carbonic acid that might have combined with it during the solution, some ammonia was mixed with it, and 0,58 of a gramm of phosphat of lime were obtained; thus there remained 40,178 gramms of carbonat of lime, from which it appears that 1000 parts of egg-shells are formed,

1st. Of carbonat of lime . .	896
2d. Of phosphat of lime . .	57
3d. Of animal gluten . .	47
Total	1000

The weight of eggs vary according to the sort of hen, according as the laying is more or less accelerated, and various other circumstances; but from a number of experiments, Vauquelin fixes the medium term at 58,117 gramms. Hence a hen that has laid 130 eggs in six months, which is pretty common, has formed 7486,226 gramms, or 7 kilogramms, 4 hectogramms, 8 decagramms, 6 gramms, and 226 thousandths of a gramm of matter employed in the formation of these eggs, of which 641,685 gramms are to be substracted for the shells; there remain then for the substance of the egg itself 7333,793 gramms, or 14lb. 15oz. 7drs. 8grs.

Shells of Animals.

These, like the shells of different eggs, are of various colours, but far exceed them in beauty as well as in utility. Till lately, however, very little was known with respect to their component parts. According to Neumann, they yield less oily and saline matter by distillation than either horn or bone; he has also observed, that some are more easily converted into quicklime by fire than others, whilst a few suffer no such change.

For the best analysis of shells we are indebted to Mr. Hatchett, whose experiments were made on those of marine animals; and the menstrua, precipitants, and mode of operation he made use of, were the following. The shells he examined he divides into two kinds, from the substance of which they are composed the first have a porcelain aspect, with an enamelled surface, and, when broken, are often in a slight degree of a fibrous texture. These porcelain shells are the various species of voluta, cypræa, and others of a similar nature. The second kind have, generally, if not always, a strong epidermis, under which is the shell, principally or entirely composed of the substance called nacre, or mother-of-pearl, such as the oyster, the river muscle, the haliotis iris, and the turbo olearius. These were immersed in acetous acid, or nitric acid diluted; according to circumstances, with 4, 5, 6, or more parts of distilled water; and the solution was always made without heat. The carbonat of lime was precipitated by carbonat of ammonia, or of potash; and phosphat of lime (if present) was previously precipitated by pure or caustic ammonia. If any other phosphat, like that of soda, was suspected, it was discovered by solution of acetite of lead.

Five hundred grains of tortoise-shell yielded 80 grains of coal; from which 3 grains of earthy matter being deducted, 77 grains remain for the proportion of coal. These three grains consisted of phosphat of soda and lime, with some traces of iron; but Mr. Hatchett thinks it probable that the latter was accidentally present.

Tortoise-shell appears to be formed (as far as organic arrangement is concerned) in the way of stratum super stratum, and this structure is particularly to be discovered after long maceration in diluted nitric acid; for then this shell appears to be composed, like the black polished gorgonia, of membranaceous laminæ, and the varieties of horn, differ only by a tendency to the fibrous organization.

Porcelain-Shells.

Shells of this description, when exposed to a red heat in a crucible for about a quarter of an hour, crackled and lost the colours of their enamelled surface; they did not emit any apparent smoke, nor any smell, like that of burned horn or cartilage. Their figure remained unchanged, excepting a few flaws, and they became of an opaque white, tinged partially with pale grey, but retained part of their original gloss.

Fresh shells (whether entire or in powder) dissolved with great effervescence in the various acids, and the solution afterwards remained colourless and transparent; but the burned shells, on being dissolved, deposited a very small quantity of animal coal; and thereby the presence of some gluten was denoted, although the proportion was too small to be discovered in the solution of the fresh unburned shells.

The various solutions were filtered and examined by pure ammonia and acetit of lead; but there was no trace of phosphat of lime, nor of any other combination of phosphoric acid. The carbonat of lime was afterwards precipitated by carbonat of ammonia; and from many experiments it appeared that porcelain-shells consist of carbonat of lime, cemented by a very small portion of animal gluten.

Previous to the experiments on the second sort of shells, this chemist examined some patellæ from Madeira. Exposed to a red heat in a crucible, there was a perceptible smell, like that of horn, hair, or feathers. The proportion of carbonic matter, deposited by the subsequent solution, was more considerable than that of the porcelain-shells, and the proportion of carbonat of lime, relative to their weight, was less. When the recent shells were immersed in very dilute nitric acid, the epidermis was separated, the whole of the carbonat of lime was dissolved, and a gelatinous substance, nearly liquid, remained; but without retaining the figure of the shell, and without any fibrous appearance. These shells, therefore, contain a larger proportion of more viscid gelatinous substance than the porcelain; but the solution separated from this gelatinous substance afforded nothing but carbonat of lime.

Pearl-Shells.

In the examination of the shells composed of nacre or mother-of-pearl, he found that, on exposing the shell of the common oyster to a red heat, the effects were the same as those observed in the patellæ; and the solution of the unburned shell was similar, only the gelatinous part was rather of a greater consistency.

A species of river muscle was next subjected to experiment. This, when burned in a crucible, emitted much smoke, with a strong smell of burned cartilage or horn; the shell throughout became of a dark grey, and exfoliated. By solution in the acids, a large quantity of carbonic matter was separated, and much less carbonat of lime was obtained from a given weight of the shell, than from those already mentioned.

On immersing an unburned shell in dilute nitric acid, a rapid solution and effervescence at first took place, but gradually became less; so that the disengagement of the carbonic acid gass was to be perceived only at intervals. At the end of two days, nearly the whole of the carbonat of lime was dissolved, but a series of membranes retaining the figure of the shell remained; of which the epidermis constituted the first. In the beginning, the carbonat of lime was readily dissolved, because the acid menstruum had an easy access; but after this, it had more difficulty to insinuate itself between the different membranes, and of course the solution of the carbonat of lime was slower. During the solution, the carbonic acid gass was entangled, and retained in many places between the membranes, so as to give the whole a cellular appearance.

The haliotis iris, and the turbo olearius, resembled this muscle, excepting that their membranaceous parts were more compact and dense. These shells, when deprived of their hardening substance, or carbonat of lime, by an acid menstruum, appear to be formed of various membranes, applied stratum upon stratum. Each membrane has a corresponding coat, or crust of carbonat of lime; which is so situated, that it is always between every two membranes, beginning with the epidermis, and ending with the last formed internal membrane.

The animals which inhabit these stratified shells increase their habitation by the addition of a stratum of carbonat of lime, secured by a new membrane; and as every additional stratum exceeds in extent that which was previously formed, the shell becomes stronger in proportion as it is enlarged; and the growth and age of the animal becomes denoted by the number of strata which concur to form the shell.

Although the haliotis iris, and the turbo olearius, are composed of the true mother-of-pearl, this chemist was induced to repeat the foregoing experiments on some detached pieces of mother-of-pearl, such as are brought from China; and the results were precisely the same. He, however, observes, that the membranaceous, or cartilaginous parts of these shells, as well as of the pieces of mother-of-pearl, retained the exact figure of the shell or piece, which had been immersed in the acid menstruum; and these membranaceous parts distinctly appeared to be composed of fibres, placed in a parallel direction, corresponding to the configuration of the shell.

The same experiments were made on pearls, which proved to be similar in composition to the mother-of-pearl; and so far as the size would enable him to discern, they appeared to be formed by concentric coats of membrane, and carbonat of lime; by this structure, they much resemble the globular calcareous concretions formed at Carlsbad, and other places, called pisolithes. The wavy appearance, and irridescency of mother-of-pearl, and of pearl, are evidently the effects of their lamellated structure and semitransparency, in which, in some degree, they are resembled by the lamellated stone, called adularia.

When the experiments on the porcelain-shells, and on those formed of mother-of-pearl, are compared, it appears, that the porcelain-shells are composed of carbonat of lime, cemented by a very small portion of gluten; and that mother-of-pearl, and pearl, do not differ from these, except by a smaller proportion of carbonat of lime; which, instead of being simply cemented by animal gluten, is intermixed with, and serves to harden, a membranaceous or cartilaginous substance; and this substance, even when deprived of the carbonat of lime, still retains the figure of the shell. But between these extremes, there will probably be found many gradations, and these we have the greater reason to expect from the example afforded by the patellæ.

Mr. Hatchett having stated the difference between porcelain-shell and mother-of-pearl, thinks it is not possible to avoid the comparing of these to enamel and tooth. When porcelain-shell, whole or in powder, is exposed to the action of acids, it is completely dissolved, without leaving any residuum; and enamel is also completely dissolved in the like manner.

Porcelain-shell and enamel, when burned, emit little or no smoke, nor scarcely any smell of burned horn or cartilage. Their figure, after exposure to fire, is not materially changed, except by cracking in some parts; their external gloss partly remains, and their colour at most becomes grey, very different from what happens to mother-of-pearl, or tooth. In their fracture, they have a fibrous texture; and in short, the only essential difference between them appears to be, that porcelain-shells consist only of carbonat of lime, and enamel of phosphat of lime, each being cemented by a small portion of gluten.

In like manner, if the effects produced by fire and acid menstrua, on shells composed of mother-of-pearl, and on the substance of teeth and bone are compared, great similarity will be found; for when exposed to a red heat, 1st. they smoke much, and emit a smell of burned cartilage or horn. 2d. They become of a dark grey or black colour. 3d. The animal coal thus formed, is of difficult incineration. 4th. They retain much of their original figure; but the membranaceous shells are subject to exfoliate. 5th. These substances (pearl, mother-of-pearl, tooth, and bone), when immersed in certain acids, part with their hardening or ossifying substances, and then remain in the state of membrane or cartilage. 6th. When previously burned, and afterward dissolved in acids, a quantity of animal coal is separated, according to the proportion of the gelatinous, membranaceous, or cartilaginous substance, and according to the duration of the red heat. And lastly, the acid solutions of these substances, by proper precipitants, afford carbonat of lime in the one case, and phosphat principally in the other, in a proportion relative to the membrane or cartilage, with which, or on which, the one or the other had been mixed or deposited.

A porcelain-shell principally differs from mother-of-pearl, only by a relative proportion between the carbonat of lime, and the gluten or membrane; in like manner the enamel appears only to be different from tooth or bone, by being destitute of cartilage, and by being principally formed of phosphat of lime, cemented by gluten.

The difference in the latter case, seems to explain why the bones and teeth of animals fed on madder became red; when at the same time, the like colour is not communicated to the enamel; for it appears probable, that the cartilages which form the original structure of the teeth and bones, become the channels by which the tingeing principle is communicated and diffused. These comparative experiments prove, that there is a great approximation in the nature of porcelain-shells, and the enamel of teeth, and also in that of mother-of-pearl and bone; and if a shell should be found composed of mother-of-pearl, coated by the porcelain substance, it will resemble a tooth coated by the enamel, with the difference of carbonat being substituted for the phosphat of lime.

Some few experiments were made on certain land shells; and in that of the common garden snail, this chemist thought he discovered some traces of phosphat of lime, but as he found none in the helix nemoralis, it may be doubted whether the presence of the phosphat of lime should be considered as a chemical character of land shells.

Experiments on the substance called the bone of the cuttle-fish, prove that it is exactly similar to shell in composition, and consists of various membranes, hardened by carbonat of lime, without the smallest mixture of phosphat, and of course is improperly called a bone.

Crustaceous Parts.

Mr. Hatchett not being acquainted with any experiments, by which the chemical nature of the substance which covers the different crustaceous marine animals, as the echini, star-fish, crabs, lobsters, &c. had been determined, was desirous to ascertain in what respect it differed from shell; and he began his experiments on three species of echinus. He was the more inclined to begin with the echini, because naturalists do not appear to be perfectly agreed whether to call them testaceous or crustaceous animals; for Klein, who has written a book upon them, regards them as belonging to the first tribe; whilst Linnéus, on the contrary, looked upon them as of the second. Now, as the experiments above related had proved that the shells of marine animals were composed of carbonat of lime, without any phosphat, this chemist thought it very possible, that the covering of the crustaceous animals might, in some respect, be different; and if so, he might be enabled, by chemical characters, to ascertain the class to which the echinus was to be referred.

Of the three echini examined, one had small spines; the second had large obtuse spines, and the third was of a very flat form. Portions of these echini were separately immersed in acetous, muriatic, and diluted nitric acid, by each of which they were completely dissolved, with much effervescence, depositing at the same time a thin outer skin or epidermis. The transparency of the solutions was also disturbed by a portion of gluten, which remained suspended, and communicated a brownish colour to the liquors. The solutions in acetous and diluted nitric acids were filtered; after which, from the acetous solution of each echinus, a precipitate of phosphat of lead was obtained, by the addition of the acetite of lead; and having thus proved the presence of phosphoric acid, the nitric solutions were saturated with pure ammonia, by which a quantity of phosphat of lime was obtained, much inferior, however, in quantity to the carbonat of lime, which was afterward precipitated by carbonat of ammonia.

The composition of the crust of the echinus is therefore different from that of marine shells; and by the relative proportions and nature of the ingredients, it approaches most nearly to the shells of the eggs of birds; which, in like manner, consist of carbonat, with a small proportion of phosphat of lime, cemented by gluten.

It remained now to examine the composition of those substances which are decidedly called crustaceous; but previous to this, some experiments were made on the asterias, or star-fish; and that species was used which is commonly found on our coasts, known by the common name of five fingers, or the asterias rubens of Linnéus.

When the asterias was immersed in the acids, a considerable effervescence was produced, and a thin external stratum was dissolved; after which it remained in a perfectly coriaceous state, and complete in respect to the original figure. The dissolved portion, being examined by the usual precipitants, proved to be carbonat of lime, without any mixture of phosphat; but in another species of the asterias with twelve rays, or the asterias papposa of Linnéus, a small quantity of phosphat of lime was discovered. This chemist was therefore induced to suspect, that in the different species of asterias, nature makes an imperfect attempt to form shell on some, and a crustaceous coating on others; and that a series of gradations is thus formed between the testaceous, the crustaceous, and the coriaceous marine animals.

It was now requisite to ascertain, whether phosphat of lime were a component part of the substance which covers the crustaceous, marine, or aquatic animals; such as the crab, lobster, prawn, and cray-fish. Pieces of this substance, taken from various parts of those animals, were at different times immersed in acetous and diluted nitric acid; those which had been placed in the diluted nitric acid, produced a moderate effervescence; and in a short time were found to be soft and elastic, of a yellowish white colour, and like a cartilage which retained the original figure. The same effects were produced by acetous acid, but in a less degree; in the latter case also, the colouring matter remained, and was soluble in alcohol.

All the solutions, both acetous and nitric, afforded carbonat and phosphat of lime, although the former was in the largest proportion.

There is reason to affirm, therefore, that phosphat of lime, mingled with the carbonat, is a chemical characteristic, which distinguishes the crustaceous from the testaceous substances; and that the principal difference in the qualities of each, when complete, is caused by the proportion of the hardening substance, relative to the gluten, by which they are cemented; or by the abundance and consistency of the gelatinous, membranous, or cartilaginous substance, in and on which the carbonat, or the mixture of carbonat and phosphat of lime, has been secreted and deposited. Moreover, as the presence of phosphat of lime, mingled with carbonat, appears to be a chemical character of crustaceous marine animals; there is every reason to conclude, that Linnéus did right not to place the echini among the testaceous ones.

The presence of phosphat of lime, in the substance which covers the crustaceous marine animals, appears to denote an approximation to the nature of bone; which not only by the experiments of Gahn, but by the united testimony of all chemists, has been proved principally to consist (as far as the ossifying substance is concerned) of phosphat of lime.

By the experiments on various shells, crustaceous substances, and bones, it is therefore proved according to Hatchett, 1. that the porcelain shells resemble the enamel of teeth in the mode of formation, but that the hardening substance is carbonat of lime. 2. That shells composed of nacre, or mother-of-pearl, or approaching to the nature of that substance, and also pearls, resemble bone in a considerable degree, as they consist of a gelatinous, cartilaginous, or membranaceous substance, forming a series of gradations, from a tender and scarcely perceptible jelly, to membranes completely organized; in, and upon which, carbonat of lime is secreted and deposited after the manner that phosphat of lime is in the bones; and therefore as the porcelain-shells resemble the enamel of teeth, so the shells formed of mother-of-pearl, &c. in like manner resemble bone; the distinguishing chemical character of the shells being carbonat of lime, and that of enamel and bones being phosphat of lime. 3. That the crust which covers certain marine animals, such as crabs, lobsters, cray-fish, and prawns, consists of a strong cartilage, hardened by a mixture of carbonat and phosphat of lime; and that thus these crustaceous bodies occupy a middle place between shell and bone, although they incline principally to the nature of shell. 4. And lastly, that a certain proportion of lime enters the compo-

sition of bones in general; the proportion of it, however, being to the phosphat of lime, vice versa, to that observed in the crustaceous marine substances. Upon the view, therefore, of these facts, it is evident, that there is a great similarity in the construction of shell and bone, and that there is even an approximation in the nature of their composition, by the intermediate crustaceous substances.

CONCHOLOGY also embraces a survey of an immense multitude and variety of shells, found buried oftentimes at great depths beneath the surface of the earth, and occasionally appertaining to animals which either do not now exist, or which are not known to exist. This branch of study may be properly characterised by the name of fossile conchology, and is rather a section of the general science of mineralogy or oryctology, as it may be more correctly called, than of zoology.

Of these shells, some are found remaining almost entirely in their native state, but others are variously altered by being impregnated with particles of stone and of other fossils; in the place of others there is found mere stone or spar, or some other native mineral body, expressing all their lineaments in the greatest nicety, as having been formed wholly from them, the shell having been first deposited in some solid matrix, and thence dissolved by very slow degrees, and this matter left in its place, on the cavities of stone and other solid substances, out of which shells had been dissolved and washed away, being afterwards filled up less slowly with these different substances, whether spar or whatever else; these substances, so filling the cavities, can necessarily be of no other form than that of the shell, to the absence of which the cavity was owing, though all the nicer lineaments may not be so exactly expressed. Besides these, we have also in many places masses of stone formed within various shells; and these having been received into the cavities of the shells while they were perfectly fluid, and having therefore nicely filled all their cavities, must retain the perfect figures of the internal part of the shell, when the shell itself should be worn away or perished from their outside. The various species we find of these are, in many genera, as numerous as the known recent ones; and as we have in our own island not only the shells of our own shores, but those of many other very distant ones, we have also many species, and those in great numbers, which are in their recent state the inhabitants of other yet unknown or unsearched seas and shores. The cockles, muscles, oysters, and the other common bivalves of our own seas, are very abundant: but we have also an amazing number of the nautilus kind, particularly of the nautilus græcorum, which though a shell not found living in our own or any neighbouring seas, yet is found buried in all our clay-pits about London and elsewhere; and the most frequent of all fossile shells, in some of our countries, are the conchæ anomiæ, which yet we know not of in any part of the world in their recent state. Of this sort also are the cornua ammonis and the gryphitæ, with several of the echinitæ and others.

The exact similitude of the known shells, recent and fossile, in their several kinds, will by no means suffer us to believe, that these, though not yet known to us in their living state, are, as some have idly thought, a sort of lusus naturæ. It is certain, that of the many known shores, very few, not even those of our own island, have been yet carefully searched for the shell-fishes that inhabit them; and as we see in the nautilus græcorum an instance of shells being brought from very distant parts of the world to be buried here, we cannot wonder that yet unknown shores, or the unknown bottoms of deep seas, should have furnished us with many unknown shell-fishes, which may have been brought with the rest; whether that were at the time of the general deluge, or the effect of any other catastrophe of a like kind, or by whatever other means, to be left in the yet unhardened matter of our stony and clayey strata.

CONCI'LIAR. *a.* (*concilium*, Latin.) Relating to a council (*Baker*).

To CONCI'LIATE. *v. a.* (*concilio*, Latin.) To gain; to win; to reconcile (*Brown*).

CONCILIA'TION. *s.* (from *conciliate.*) The act of gaining or reconciling.

CONCILIA'TOR. *s.* (from *conciliate.*) One that makes peace between others.

CONCI'LIATORY. *a.* (from *conciliare.*) Relating to reconciliation.

CONCI'NNITY. *s.* (from *concinnitas*, Lat.) Decency; fitness; neatness.

CONCI'NNOUS. *a.* (*concinnus*, Latin.) Becoming; pleasant; agreeable.

CONCINNOUS INTERVALS, in music, are such as are fit for music, next to, and in combination with concords; being neither very agreeable nor disagreeable in themselves; but having a good effect by their mixture with those which precede and follow them.

CONCI'SE. *a.* (*concisus*, Latin.) Brief; short; broken into short periods (*Ben Jonson*).

CONCI'SELY. *ad.* Briefly; shortly (*Bro.*).

CONCI'SENESS. *s.* (from *concise.*) Brevity; shortness (*Dryden*).

CONCI'SION. *s.* (*concisum*, Lat.) Cutting off; excision.

CONCITA'TION. *s.* (*concitatio*, Lat.) The act of stirring up (*Brown*).

CONCLAMA'TIO, in antiquity, a shout raised at the burning of the dead, before the funeral pile was fired.

CONCLAMA'TION. *s.* (*conclamatio*, Lat.) An outcry or shout of many together.

CONCLAVE, the place in which the cardinals of the Romish church meet, and are shut up, in order to elect a pope. The conclave is a range of small cells, ten feet square, made of wainscot: these are numbered, and drawn for by lot. They stand in a line along the galleries and hall of the Vatican, with a small space between each. Every cell has the arms of the cardinal over it. The conclave is not fixed to any one determinate place, for the constitutions of the church allow the cardinals to make choice of such a place for the conclave as they think most convenient; yet it is generally held in the Vatican. The conclave is strictly guarded by troops: neither the cardinals, nor any person shut up in the conclave, are spoke to, but at the hours allowed of, and then in Italian or Latin; even the provisions for the conclave are examined, that no letters be conveyed by that means from the ministers of foreign powers, or other persons who may have an interest in the election of the pontiff.

CONCLAVE is also used for the assembly or meeting of the cardinals shut up for the election of a pope.

To CONCLU'DE. *v. a.* (*concludo;* Latin.) 1. To shut (*Hooker*). 2. To include; to comprehend (*Romans*). 3. To collect by ratiocination (*Tillotson*). 4. To decide; to determine (*Addison*). 5. To end; to finish (*Dryden*).

To CONCLU'DE. *v. n.* 1. To perform the last act of ratiocination; to collect the consequence (*Boyle*). 2. To settle opinion (*Atterbury*). 3. To determine finally (*Shakspeare*). 4. To end (*Dryden*).

CONCLU'DENCY. *s.* (from *concludent.*) Consequence; regular proof (*Hale*).

CONCLU'DENT. *a.* (from *conclude.*) Decisive (*Hale*).

CONCLU'SIBLE. *a.* (from *conclude.*) Determinable (*Hammond*).

CONCLU'SION. *s.* (from *conclude.*) 1. Determination; final decision (*Hooker*). 2. The collection from propositions premised; the consequence (*Tillotson*). 3. The close; the last result (*Swift*). 4. The event of experiments; experiment (*Shakspeare*). 5. The end; the last part (*Howel*). 6. Silence; confinement of the thoughts (*Shakspeare*).

CONCLUSION. In oratory. See PERORATION.

CONCLU'SIVE. *a.* (from *conclude.*) 1. Decisive; giving the last determination to the opinion (*Rogers*). 2. Regularly consequential (*Locke*).

CONCLU'SIVELY. *ad.* Decisively; with final determination (*Bacon*).

CONCLU'SIVENESS. *s.* Power of determining the opinion; regular consequence (*Hale*).

To CONCOA'GULATE. *v. a.* To congeal one thing with another (*Boyle*).

CONCOAGULA'TION. *s.* (from *concoagulate.*) A coagulation by which different bodies are joined in one mass.

To CONCO'CT. *v. a.* (*concoquo,* Latin.) 1. To digest by the stomach (*Hayward*). 2. To purify or sublime by heat (*Thomson*). 3. To ripen (*Bacon*).

CONCO'CTION. *s.* (from *concoct.*) Digestion in the stomach; maturation by heat (*Bacon*). See DIGESTION.

CONCO'LOUR. *a.* (*concolor,* Latin.) Of one colour; without variety (*Brown*).

CONCO'MITANCE. CONCO'MITANCY. *s.* (from *concomitor,* Lat.) Subsistence together with another thing (*Glanville*).

CONCO'MITANT. *a.* (*concomitans,* Lat.) Conjoined with; concurrent with (*Locke*).

CONCO'MITANT. *s.* Companion; person or thing collaterally connected (*South*).

CONCO'MITANTLY. *ad.* (from *concomitant.*) In company with others.

To CONCO'MITATE. *v. a.* (*concomitatus,* Lat.) To be collaterally connected with any thing; to attend; to accompany (*Harvey*).

CO'NCORD. *s.* (*concordia,* Latin.) 1. Agreement between persons or things; peace; union (*Shakspeare*). 2. A compact (*Davies*). 3. Harmony; consent of sounds (*Shakspeare*). 4. Principal grammatical relation of one word to another (*Locke*).

CONCORD (Form of), in ecclesiastical history, a standard-book among the Lutherans, composed at Torgaw, in 1576, and thence called the Book of Torgaw, and reviewed at Berg, by six Lutheran doctors of Germany, the principal of whom was James Andreæ. This book contains in two parts, a system of doctrine, the subscription of which was a condition of communion, and a formal and very severe condemnation of all who differed from the compilers of it, particularly with respect to the majesty and omnipresence of Christ's body, and the real manducation of his flesh and blood in the eucharist. It was first imposed on the Saxons by Augustus, and occasioned great opposition and disturbance, both among the Lutherans and reformed. The dispute about it was revived in Switzerland in 1718, when the magistrates of Bern published an order for adopting it as the rule of faith; the consequence of which was a contest, that reduced its credit and authority. Mosheim's Eccl. Hist. by Dr. Maclaine, vol. iv. p. 53, &c. and vol. v. p. 98.

CONCORD, in grammar, that part of syntax, or construction, whereby the words of a sentence agree among themselves, i. e. whereby nouns are put in the same case, number, gender, &c. and verbs in the same number and person, with nouns and pronouns. See GRAMMAR.

CONCORD, a town of United America, in New Hampshire, on the Merrimack: fifty-seven miles N.N.W. Boston, and 185 N.N.E. New York.

CONCORD, an island of United America, in the state of Massachusetts: seventeen miles W.N.W. Boston.

CONCORD, a river of United America, in Massachusetts, which runs into the Merrimack, nine miles S.W. Andover.

CONCORD, in music, the relation of two sounds that are always agreeable to the hearer, whether applied in consonance or succession. Of concords there are two kinds, the one called perfect, the other imperfect; perfect concords consist of the fifth and eighth; imperfect concords of the third and sixth. The imperfect concords have also another distinction; that of the greater and lesser third and sixth. The concords are again divided into consonant and dissonant. The consonant concords are the perfect concord and its derivatives; every other is a dissonant concord.

It is not easy to assign a reason for the pleasure afforded by concords. Why, it has been asked, should two sounds which form together the fifth or the major third, excite pleasure, while we experience disagreeable sensations on hearing sounds which are distant only a tone or semitone? Although it would be difficult to give a positive answer to this question, a few observations may throw some light upon it.

Pleasure, it is asserted by some, arises from the perception of relations; and the assertion is supported by various examples from the arts. The pleasure, then, say they, derived from music, consists in the perception of the relations of sounds. But are these relations sufficiently

simple for the soul to perceive and distinguish their order? It is replied, that sounds will please when heard together in a certain order; but, if their relations are too complex, or, if they are entirely destitute of order, they will displease. This reasoning is attempted to be proved by an enumeration of the known concords and discords. In unison, the vibrations of the two sounds continually coincide: this, therefore, is the simplest kind of relation. Unison, also, is the first concord in the octave; the two sounds of which this interval is composed perform their vibrations in such a manner, that two of the one are completed in the same time as one of the other: thus the unison is succeeded by the octave. This interval is so natural to man, that he who cannot reach a sound too grave or too acute for his voice, falls into the higher or lower octave.

When the vibrations of two sounds are performed in such a manner that three of the one correspond to one of the other, these give the simplest relation next to those above-mentioned. Who does not know that the concord most agreeable to the ear is the twelfth, or the octave of the fifth? In that respect it even surpasses the fifth. Next to the fifth, is the double octave of the fifth, or the seventeenth major, which is expressed by the ratio of 1 to 3. This concord, next to the twelfth, is the most agreeable. The fourth, expressed by $\frac{3}{4}$, the third minor, expressed by $\frac{5}{6}$, and the sixths, both major and minor, expressed by $\frac{5}{8}$ and $\frac{3}{5}$, are concords, for the same reason. But it appears that all the other sounds, after these relations, are too complex for the soul to perceive their order.

We admit the facts above stated respecting the coincidence of the vibrations; but still conceive that the theory, to support which they are adduced, is more ingenious than solid. Why should this coincidence of vibrations, this simultaneous impulse on the same organs of sensation, and the accident of beginning frequently at the same time, prove so great a source of pleasure? Upon what is this gratuitous supposition founded? And, though one should grant it, would it not follow from thence, that the same chord should successively and rapidly affect us with contrary sensations, since the vibrations are alternately coincident and discrepant? On the other hand, how should the ear be so sensible to the simplicity of relations, whilst, for the most part, these relations are entirely unknown to him whose organs are, notwithstanding, sensibly affected with the charms of agreeable music?

Let us, then, abandon this theory, and enquire whether the celebrated experiment on the resonance of bodies (see CHORD, GENERATOR, HARMONICS) may not serve to account in a still more plausible manner for the pleasure arising from concords: because, as every sound degenerates into mere noise when not accompanied with its twelfth and its seventeenth major, besides its octaves, is it not evident, that when we combine any sound with its twelfth, or its seventeenth major, or with both at the same time, we only imitate the process of nature, by giving to that sound, in a fuller and more sensible manner, the accompaniment which nature itself gives it, and which cannot fail to please the ear, on account of the habit it has acquired of hearing them together? This is so agreeable to truth, that there are only two primitive concords, the twelfth and the seventeenth major; and that the rest, as the fifth, the third major, the fourth, and the sixth, are derived from them. We know also, that these two primitive concords are the most perfect of all, and that they form the most agreeable accompaniment that can be given to any sound, though, on the harpsichord for example, to facilitate the execution, the third major and the fifth itself, which, with the octave, form what is called perfect harmony, are substituted in their stead. But this harmony is perfect only by representation, and the most perfect of all, would be that in which the twelfth and the seventeenth were combined with the fundamental sound and its octaves. It would be easy to enlarge farther on this idea; but what has been already said will, we trust, be thought sufficient.

Addition, &c. of Concords.

For those who wish to know what concords result from two or more concords, either when added, or subtracted, or multiplied by each other, we add the following rules.

1. *To add one Concord to another.*

Express the two concords by the fractions which represent them, and then multiply these two fractions together: that is to say, first the numerators and then the denominators: the number thence produced will express the concord resulting from the sum of the two concords given.

Thus the expression for the fifth is $\frac{2}{3}$, and that for the fourth $\frac{3}{4}$, the product of which is $\frac{6}{12} = \frac{1}{2}$, being the expression for the octave. It is indeed well known that the octave is composed of a fifth and a fourth.

2. *To subtract one Concord from another.*

Instead of multiplying together the fractions which express the given concords, invert that which expresses the concord to be subtracted from the other, and then multiply them together as before.

Thus, the expression of the octave is $\frac{1}{2}$; that of the fifth $\frac{2}{3}$, which inverted gives $\frac{3}{2}$: by which let $\frac{1}{2}$ be multiplied, and there arises $\frac{3}{4}$, which expresses the fourth.

3. *To double a Concord, or to multiply it any number of times, at pleasure.*

In this case, nothing is necessary but to raise the terms of the fraction which expresses the given concord, to the power denoted by the number of times it is to be multiplied; that is, to the square, if it is to be doubled; to the cube, if to be tripled, and so on.

Thus the concord arising from the tone major tripled, is $\frac{512}{729}$; for as the expression of the tone major is $\frac{8}{9}$, we shall have $8 \times 8 \times 8 = 512$, and $9 \times 9 \times 9 = 729$. This concord $\frac{512}{729}$ corresponds to the interval between *ut* and a *fa*, higher than *fa* sharp of the gamut.

4. *To divide one concord by any number at pleasure, or to find a concord which shall be the half, third, &c. of a given concord.*

To answer this problem, take the fraction which expresses the given concord, and extract that root of it which is denoted by the determinate divisor; that is to say, the square root, if the concord is to be divided into two; the cube root, if it is to be divided into three, &c. and this root will express the concord required.

As the octave is expressed by $\frac{1}{2}$, if the square root of it be extracted, it will give $\frac{7}{10}$ nearly; but $\frac{7}{10}$ is less than $\frac{3}{4}$, and greater than $\frac{2}{3}$; consequently the middle of the octave is between the fourth and the fifth (*Despiau's Amusements*).

CONCO'RDANCE. *s.* (*concordantia*, Lat.) Agreement.

Concordance, a dictionary or index to the Bible, wherein all the leading words, used in the course of the inspired writings, are ranged alphabetically; and the various places where they occur referred to; to assist in finding out passages, and comparing the several significations of the same word.

Cardinal Hugo de St. Charo is said to have employed five hundred monks at the same time in compiling a Latin concordance: beside which, we have several other concordances in the same language; one, in particular, called the Concordance of England, compiled by J. Darlington, of the order of Predicants; another more accurate one, by the Jesuit de Zamora.

R. Mordecai Nathan has furnished us with a Hebrew concordance, first printed at Venice in 1523, containing all the Hebrew roots branched into their various significations, and under each signification all the places in Scripture wherein it occurs: but the best and most useful Hebrew concordance is that of Buxtorf, printed at Basil in 1632.

Dr. Taylor published, in 1754, a Hebrew concordance in two volumes folio, adapted to the English Bible, and disposed after the manner of Buxtorf. See the preface of this work.

Calasius, an Italian cordelier, has given us concordances of the Hebrew, Latin, and Greek, in two columns: the first, which is Hebrew, is that of R. Mordecai Nathan, word for word, and according to the order of the books and chapters: in the other column is a Latin interpretation of each passage of Scripture quoted by R. Mordecai; this interpretation is Calasius's own; but in the margin he adds that of the LXX. and the Vulgate, when different from his. The work is in four volumes folio, printed at Rome in 1621.

We have several very copious concordances in English; as Newman's, Butterworth's, Cruden's, and the Cambridge Concordance.

CONCO'RDANT. *a.* (*concordans*, Latin.) Agreeable; agreeing; correspondent (*Brown*).

CONCORDAT, in the canon law, a covenant or agreement in some beneficiary matter, as relating to a resignation, permutation, or other ecclesiastical cause. This word is used absolutely among the French for an agreement between pope Leo I. and Francis I. of France, for regulating the manner of nominating to benefices.

Concordat, as it is now used in France, applies exclusively to an agreement or convention exchanged between the pope, Pius VII., and the French government, September 10, 1801. In that agreement the Roman catholic religion is acknowledged to be that of the majority of the French people; and the pope acknowledges in the then first consul of the French government the same rights and prerogatives which the ancient government possessed.

CONCORDIA, a town of Mirandola, in Italy, 15 miles S. of Mantua; it is subject to the house of Austria. Lat. 44. 52 N. Lon. 11. 13 E.

Concordia, an episcopal town of Friuli, in Italy, belonging to the Venetians. It was once a considerable place, but has never been able to repair the damages which the soldiers under Attila did to it.

CONCO'RPORAL. *a.* (from *concorporo*, Latin.) Of the same body.

To CONCO'RPORATE. *v. a.* To unite into one mass or substance (*Taylor*).

CONCORPORA'TION. *s.* Union in one mass.

CO'NCOURSE. *s.* (*concursus*, Latin.) 1. The confluence of many persons or things to one place (*Ben Jonson*). 2. The persons assembled (*Dryden*). 3. The point of junction or intersection of two bodies (*Newton*).

CONCREMA'TION. *s.* (from *concremo*, Latin.) The act of burning many things together.

CO'NCREMENT. *s.* (from *concresco*, Latin.) The mass formed by concretion (*Hale*).

CONCRE'SCENCE. *s.* (from *concresco*, Latin.) The act or quality of growing by the union of separate particles (*Raleigh*).

To CONCRE'TE. *v. n.* (*concresco*, Latin.) To coalesce into one mass (*Newton*).

To Concre'te. *v. a.* To form by concretion (*Hale*).

Co'ncrete. *a.* (from the verb.) 1. Formed by concretion (*Burnet*). 2. (In logick.) Not abstract: applied to a subject (*Hooker*).

Concrete numbers, are those which are applied to express or denote any particular subject: as, two men, three pounds, &c.

Co'ncrete. *s.* A mass formed by concretion (*Bentley*).

CONCRE'TELY. *ad.* (from *concrete.*) In a manner including the subject with the predicate; not abstractly (*Norris*).

CONCRE'TENESS. *s.* Coagulation; collection of fluids into a solid mass.

CONCRE'TION. *s.* (from *concrete.*) 1. The act of concreting; coalition. 2. The mass formed by a coalition of separate particles (*Bacon*).

Concretion, in surgery. See Stone and Calculus.

CO'NCRETIVE. *a.* (from *concrete.*) Coagulative (*Brown*).

CO'NCRETURE. *s.* (from *concrete.*) A mass formed by coagulation.

CONCU'BINAGE. *s.* (*concubinage*, Fr.) The act of living with a woman not married (*Broo.*).

CO'NCUBINE. *s.* (*concubina*, Latin.) A woman kept in fornication; a whore (*Bacon*).

To CONCU'LCATE. *v. a.* (*conculco*, Lat.) To tread or trample under foot.

CONCULCA'TION. *s.* (*conculcatio*, Lat.) Trampling with the feet.

CONCU'PISCENCE. *s.* (*concupiscentia*, Latin.) Irregular desire; libidinous wish (*Bentley*).

CONCU'PISCENT. *a.* (*concupiscens*, Lat.) Libidinous; lecherous (*Shakspeare*).

CONCUPISCE'NTIAL. *s.* (from *concupiscent.*) Relating to concupiscence.

CONCUPI'SCIBLE. *a.* (*concupiscibilis*, Latin.) Impressing desire; eager; desirous (*South*).

To CONCU'R. *v. n.* (*concurro*. Latin.) 1. To meet in one point (*Temple*). 2. To agree; to join in one action (*Swift*). 3. To be united with; to be conjoined (*Tillotson*). 4. To contribute to one common event (*Collins*).

CONCU'RRENCE. CONCU'RRENCY. *s.* (from *concur.*) 1. Union; association; conjunction (*Locke*). 2. Combination of many agents or circumstances (*Crashaw*). 3. Assistance; help (*Rogers*). 4. Joint right; equal claim (*Ayliffe*).

CONCU'RRENT. *a.* (from *concur.*) 1. Acting in conjunction; concomitant in agency (*Hale*). 2. Conjoined; associate; concomitant (*Bacon*).

CONCU'RRENT. *s.* That which concurs; a contributary cause (*Decay of Piety*).

CONCU'SSION. *s.* (*concussio*, Latin.) 1. The act of shaking; tremefaction (*Bacon*). 2. The state of being shaken (*Woodward*).

CONCU'SSION. (*concussio*, from *concutio*, to shake together.) Concussion of the brain. This term is employed by surgeons to express a disease, which is the effect of the concussion the brain suffers from a fall or agitation. The symptoms arising from a mere concussion are, vertigo, confusion with pain in the head, tinnitus aurium, and dimness of sight. In general the person is able to walk about, and the symptoms gradually disappear; at other times they fall into a quiet sleep, and awake perfectly recovered. If, however, stupor and coma succeed, other mischief may be suspected, as compression, fracture, &c. The disease denominated concussion is also often expressed by the name of COMMOTION.

CONCU'SSIVE. *a.* (*concussus*, Lat.) Having the power or quality of shaking.

CONDAMINE (Charles Marie de la), a French mathematician, and chevalier of the order of St. Lazare; born at Paris in 1701. He was sent in 1736 with M. Godin to Peru, to measure a degree at the equator, where he suffered great hardships. On his return to Europe, he married his niece, by dispensation from the pope. He died in 1774. He wrote a journal of the abovementioned voyage, Travels through Italy, and some other works.

CONDE, a strong town of France, seated on the Scheld, in the department of the North. It has a castle, and gave the title of prince to a branch of the late royal family. Lat. 50. 27 N. Lon. 3. 39 E.

CONDE, a town of France, in the department of Calvados. Lat. 48. 50 N. Lon. 0. 37 W.

To CONDE'MN. *v. a.* (*condemno*, Latin.) 1. To find guilty; to doom to punishment (*Shaksp.*). 2. To censure; to blame (*Locke*). 3. To fine (*Chronicles*). 4. To show guilt by contrast (*Wisdom*).

CONDE'MNABLE. *a.* (from *condemn.*) Blamable; culpable (*Brown*).

CONDEMNA'TION. *s.* (*condemnatio*, Latin.) The sentence by which any one is doomed to punishment (*Romans*).

CONDE'MNATORY. *a.* (from *condemn.*) Passing a sentence of condemnation or of censure (*Gov. of the Tongue*).

CONDE'MNER. *s.* (from *condemn.*) A blamer; a censurer; a censor (*Taylor*).

CONDE'NSABLE. *a.* (from *condensate.*) Capable of condensation (*Digby*).

To CONDE'NSATE. *v. a.* (*condenso*, Lat.) To make thicker.

To CONDE'NSATE. *v. n.* To grow thicker.

CONDE'NSATE. *a.* (*condensatus*, Latin.) Made thick; compressed into less space (*Peacham*).

CONDE'NSATION, the act whereby a body is rendered more dense, compact, and heavy. Condensation is, by most writers, distinguished from compression, in regard the latter is performed by some external violence; whereas the former is the action of cold.

To CONDE'NSE. *v. a.* (*condenso*, Latin.) To make any body more thick, close, and weighty (*Woodward*).

To CONDE'NSE. *v. n.* To grow close and weighty; to inspissate (*Newton*).

CONDE'NSE. *a.* (from the verb.) Thick; dense; close; massy (*Bentley*).

CONDE'NSED BRANCHES. In botany (coarctati rami). Pressed or squeezed together, so close, as almost to be incumbent, or lie over each other, at their ends.

CONDENSER, a pneumatic engine, or syringe, whereby an uncommon quantity of air may be crowded into a given space; so that sometimes ten atmospheres, or ten times as much air as there is at the same time, in the same space, without the engine, may be thrown in by means of it, and its egress prevented by valves properly disposed.

It consists of a brass cylinder, wherein is a moveable piston; which being drawn out, the air rushes into the cylinder through a hole provided on purpose; and when the piston is again forced into the cylinder, the air is driven into the receiver through an orifice, furnished with a valve to hinder its getting out.

CONDENSER OF ELECTRICITY, an instrument first invented by Volta, the use

of which is to render sensible the very small quantities of electricity furnished by the surrounding bodies, by exciting them to accumulate upon the surface which it presents to their action. This instrument only differs from the electrophorus in so far that for the cake of resin there is substituted a body of that class which only insulates imperfectly, and which holds the middle rank between conductors and idio-electrics, white marble, for example. See ELECTRICITY.

CONDENSER OF FORCES, the name given by M. Prony to a contrivance for obtaining the greatest possible effect from a first mover, the energy of which is subject to augmentation or diminution within certain limits. A description of it may be seen in the 2d vol. of Gregory's Mechanics.

CONDE'NSITY. *s.* (from *condense.*) The state of being condensed; condensation.

CO'NDERS. *s.* (*conduire*, French.) Such as stand upon high places near the seacoast, at the time of herring fishing, to make signs to the fishers which way the shoal passes (*Cowell*).

To CONDESCE'ND. *v. n.* (*condescendre*, French.) 1. To depart from the privileges of superiority by a voluntary submission (*Watts*). 2. To consent to do more than mere justice can require (*Tillotson*). 3. To stoop; to bend; to yield (*Milton*).

CONDESCE'NDENCE. *s.* (*condescendence*, French.) Voluntary submission.

CONDESCE'NDINGLY. *ad.* (from *condescending.*) By way of voluntary humiliation; by way of kind concession (*Atterbury*).

CONDESCE'NSION. *s.* (from *condescend.*) Voluntary humiliation; descent from superiority (*Tillotson*).

Condescension is that species of benevolence, which designedly waves the supposed advantages of birth, title, or station, in order to accommodate ourselves to the state of an inferior, and diminish that restraint which the apparent distance is calculated to produce in him. It greatly enhances the value of every other species of benevolence.

CONDESCE'NSIVE. *a.* (from *condescend.*) Courteous; not haughty.

CONDI'GN. *a.* (*condignus*, Latin.) Suitable; deserved; merited (*Arbuthnot*).

CONDI'GNLY. *ad.* (from *condign.*) Deservedly; according to merit.

CONDI'GNNESS. *s.* (from *condign.*) Suitableness; agreeableness to deserts.

CONDILLAC (Stephen), a French metaphysician, member of the academy, and tutor to the infant don Ferdinand, duke of Parma. He died in 1780. His course of study, written for the use of his pupil, in 16 vols. 12mo. is a work of credit. He also wrote a treatise, entitled, Commerce and Government considered in their mutual Relations, in 12mo. a book of observation. In his metaphysical disquisitions he is accused of having served the cause of materialism.

Since the death of Condillac, a very curious treatise of his has been published, entitled, La Langue des Calculs, in which he traces all computation to its origin; explains the causes which render ordinary language inadequate to the solution of questions, when at all complicated; and enforces the necessity of mathematical language, discussing its nature, its peculiar excellence, and the grounds on which its perfection is to be attempted. In this work the abilities of Condillac appear to great advantage: we conceive an English translation of it would be an acceptable present to the public.

CO'NDIMENT. *s.* (*condimentum*, Latin.) Seasoning; sauce (*Bacon*).

CONDISCI'PLE. *s.* (*condiscipulus*, Lat.) A schoolfellow.

To CO'NDITE. *v. a.* (*condio*, Latin.) To pickle; to preserve by salts (*Taylor*).

CO'NDITEMENT. *s.* (from *condite.*) A composition of conserves, powders, and spices.

CONDI'TION. *s.* (*conditio*, Latin.) 1. Quality; that by which any thing is denominated good or bad (*Shakspeare*). 2. Attribute; accident; property (*Newton*). 3 Natural quality of the mind; temper; temperament; complexion (*Shakspeare*). 4. Moral quality; virtue or vice (*South*). 5. State; external circumstances (*Wake*). 6. Rank (*Clarendon*). 7. Stipulation; terms of compact (*Taylor*). 8. The writing of agreement; compact; bond (*Shakspeare*).

CONDITION, in the civil law, a clause of obligation stipulated as an article of a treaty or a contract; or in a donation of a testament, legacy, &c. in which last case a donee does not lose his donative if it be charged with any dishonest or impossible conditions.

CONDITION, in sporting, is a word in frequent use, to express the state of a horse in respect to his health and external appearance. If low in flesh, rough in his coat, hollow above the eye, and depressed in his spirits, he is then said to be "very much out of condition." But, on the contrary, if full of good sound flesh, his skin loose and pliable, his coat soft and sleek, he is then said to be in "perfect condition to start," if designed for the turf; to take the field, if a hunter; or, if a roadster, to undertake his journey. Horses too full of flesh or of blood are said not to be in condition, because they are not fit for strong exertions without a danger of disease: brought into constant work in such state, they soon, as it is termed, "fall all to pieces;" that is, if they escape inflammation upon some important organ, morbidity soon displays itself, in a swelling of the legs, cracked heels, bad eyes, defective wind, or cutaneous eruptions.

To CONDI'TION. *v. n.* (from the noun.) To make terms; to stipulate (*Donne*).

CONDITIONAL, something not absolute, but subject to conditions. Thus, conditional conjunctions, in grammar, are those which serve to make propositions conditional; as *if*, *unless*, *provided*, &c.

CONDITIONAL PROPOSITIONS, in logic, such as consist of two parts connected together by a conditional particle.

Conditional syllogism, a syllogism where the major is a conditional proposition. Thus, If there be a God, he ought to be worshipped—But there is a God;—Therefore he ought to be worshipped.

Condi'tional. *s.* (from the adjective.) A limitation; not in use (*Bacon*).

CONDITIONA'LITY. *s.* (from *conditional.*) Limitation by certain terms (*Decay of Piety*).

CONDI'TIONALLY. *ad.* With certain limitations; on particular terms (*South*).

CONDI'TIONARY. *a.* (from *condition.*) Stipulated (*Norris*).

To CONDI'TIONATE. *v. a.* (from *condition.*) To qualify; to regulate (*Brown*).

Condi'tionate. *a* Established on certain terms or conditions (*Hammond*).

CONDI'TIONED. *a.* Having qualities or properties good or bad (*Shakspeare*).

To CONDO'LE. *v. n.* (*condoleo*, Latin.) To lament with those that are in misfortune; to partake another's sorrow (*Temple*).

To Condo'le. *v. a.* To bewail with another (*Dryden*).

CONDO'LEMENT. *s.* (from *condole.*) Grief; sorrow; mourning (*Shakspeare*).

CONDO'LENCE. *s.* (*condoleance*, Fr.) Grief for the sorrows of another (*Arbuthnot*).

CONDO'LER. *s.* (from *condole.*) One that laments with another upon his misfortunes.

CONDOMA, in zoology, the name given by Buffon to the striped antelope of Pennant, the antilope strepsiceros of Gmelin's Linnéus.

CONDONA'TION. *s.* (*condonatio*, Lat.) A pardoning; a forgiving.

CONDORCET (Jean Antoine Nicolas Caritat de), a French philosopher. He was born at Ribemont, in Picardy, in 1743, of a noble family, from whom he derived the title of marquis. He was educated at the college of Navarre, where he shewed a strong predilection for the mathematics, and his genius being indulged, he soon distinguished himself among the geometricians. In 1765 appeared his first work, Sur le Calcul Integral, which was received with approbation by the Academy. In 1767, he published a treatise, Of the Problem of the Three Bodies; and the year following, his Analytical Essays. In 1769, he was chosen member of the Academy, and continued to publish numerous memoirs and essays on mathematical and philosophical subjects. Those of the latter description, however, were of a very dangerous tendency, as striking at the root of all religion natural and revealed. In 1773, he was appointed secretary elect to the Academy, and his eloges were greatly admired. He also wrote the Lives of Voltaire and Turgot, two biographical works of considerable merit. In 1791 he became a member of the national assembly, and from that time he devoted himself almost wholly to political affairs. It must be mentioned, however, to his honour, that Condorcet was adverse to the sanguinary proceedings of his coadjutors towards the king. When Robespierre established his authority, our philosopher being marked as a victim, concealed himself in Paris for some days, and then went to an acquaintance at Fontenai, but his friend was not at home. In this state of suspense, he spent one night in a quarry, and another under a tree in an open field. On the third day he was seized and committed to prison, as a suspicious person, in order to be sent to Paris; but he was found dead in his bed the next morning, March 28, 1794. Thus miserably perished a most able philosopher, and one of the finest writers of those that have adorned the last century. His private character is described by La Lande as easy, quiet, kind, and obliging; but his behaviour to Diderot when dying, displayed, instead of the milk of human kindness, the malignity of a fiend. Neither his conversation nor his external deportment bespoke the fire of his genius. D'Alembert used to compare him to a volcano covered with snow. He had a latent weakness, however, of constitution, which often made him the dupe of men altogether unworthy of his regard

It was during the period of his concealment at Paris, uncertain of a day's existence, that he wrote his Sketch of the Progress of the Human Mind; a production which undoubtedly displays great genius, though it contains some of the most extravagant paradoxes that ever fell from the pen of a philosopher. Among other wonderful things, the author inculcates the possibility, if not the probability, that the nature of man may be improved to absolute perfection in body and mind, and his existence in this world protracted to immortality. So firmly does he seem to have been persuaded of the truth of this unphilosophical opinion, that he set himself seriously to consider how men should conduct themselves when the population should become too great for the quantity of food which the earth can produce; and the only way which he could find for counteracting this evil was, to check population by promiscuous concubinage and other practices, with an account of which we will not sully our pages. Besides this piece he has left a tract on calculation, and an elementary treatise on arithmetic. His wife and daughter are, we believe, now living. The former has been long admired not merely for her beauty, but for her brilliant wit, and her tender and amiable qualities.

CONDORE, or Pulo Condore, an island in the Eastern Indian sea, about twenty leagues from the coast of Cochin-china. The island is fertile, with an excellent harbour, which induced the English East India company to form a settlement here in the year 1702; but a quarrel happening, most of the factory were murdered by the Cochin-chinese, and the rest expelled in the year 1705. Lon. 105. 45 E. Lat. 8. 40 N.

Condore, in ornithology, the vultur gryphus of Latham.

CONDROPTERIGIA, or Condropterigious fishes. The Linnéan name of the sixth order of the class fishes: distinguished by their cartilaginous skeleton, or gills.

To CONDU'CE. *v. n.* (*conduco*, Latin.) To promote an end; to contribute (*Tillotson*).

To CONDU'CE. *v. a.* To conduct (*Wotton*).

CONDU'CIBLE. *a.* (*conducibilis*, Latin.) Having the power of conducing (*Bentley*).

CONDU'CIBLENESS. *s.* (from *conducible.*) The quality of contributing to any end.

CONDU'CIVE. *a.* (from *conduce.*) That may contribute (*Rogers*).

CONDU'CIVENESS. *s.* (from *conducive.*) The quality of conducing (*Boyle*).

CO'NDUCT. *s.* (*conduit*, French.) 1. Management; economy (*Bacon*). 2. The act of leading troops (*Waller*). 3. Convoy; escorte; guard (*Shakspeare*). 4. A warrant by which a convoy is appointed. 5. Exact behaviour; regular life (*Swift*).

To CONDU'CT. *v. a.* (*conduire*, French.) 1. To lead; to direct; to accompany, in order to shew the way (*Milton*). 2. To usher, and to attend in civility (*Shakspeare*). 3. To manage; as, *to* conduct *an affair*. 4. To head an army.

CONDUCTI'TIOUS. *a.* (*conductitius*, Latin.) Hired; employed for wages (*Ayliffe*).

CONDU'CTOR, in electricity, a term first introduced in this science by Dr. Desaguliers, and used to denote those substances which are capable of receiving and transmitting electricity; in opposition to electrics, in which the matter or virtue of electricity may be excited and accumulated, or retained. The former are also called non-electrics, and the latter non-conductors. And all bodies are ranked under one or other of these two classes, though none of them are perfect electrics, nor perfect conductors, so as wholly to retain, or freely and without resistance to transmit the electric fluid.

To the class of conductors belong all metals and semi-metals, ores, and all fluids (except air and oils), together with the substances containing them, the effluvia of flaming bodies, ice (unless very hard frozen), and snow, most saline and stony substances, charcoals, of which the best are those that have been exposed to the greatest heat, smoke, and the vapour of hot water.

It seems probable that the electric fluid passes through the substance, and not merely over the surfaces of metallic conductors; because, if a wire of any kind of metal be covered with some electric substance, as resin, sealing-wax, &c. and a jar be discharged through it, the charge will be conducted as well as without the electric coating.

It has also been alleged, that electricity will pervade a vacuum, and be transmitted through it almost as freely as through the substance of the best conductor: but Mr. Walsh found, that the electric spark or shock would no more pass through a perfect vacuum, than through a stick of solid glass. In other instances however, when the vacuum has been made with all possible care, the experiment has not succeeded.

It may also be observed, that many of the forementioned substances are capable of being electrified, and that their conducting power may be destroyed and recovered by different processes: for example, green wood is a conductor; but baked, it becomes a non-conductor; again, its conducting power is restored by charring it; and lastly, it is destroyed by reducing this to ashes.

Again, many electric substances, as glass, resin, air, &c. become conductors by being made very hot: however, air heated by glass must be excepted.

See on this subject, Priestley's History of Electricity, vol. i.; Franklin's Letters, &c. pa. 96 and 262, edit. 1769; Cavallo's Complete Treat. of Electr. chap. ii.; Henley's Exper. and Obser. in Electr. also Philos. Trans. vol. lxvii. pa. 122; and elsewhere in the different volumes of the Transactions.

CONDUCTOR (Prime), is an insulated conductor, so connected with the electrical machine, as to receive the electricity immediately from the excited electric.

Mr. Grey first employed metallic conductors in this way, in 1734; and these were several pieces of metal suspended on silken strings, which he charged with electricity. Mr. Du Fay fastened to the end of an iron bar, which he used as his prime conductor, a bundle of linen threads, to which he applied the excited tube: but these were afterwards changed for small wires suspended from a common gun-barrel, or other metallic rod.

In the present advanced state of the science, this part of the electrical apparatus has been considerably improved. The prime conductor is made of hollow brass, and generally of a cylindric form. Care should be taken that it be perfectly smooth and round, without points and sharp edges. The ends of the conductor are spherical; and it is necessary, that the part most remote from the electric should be made much larger and rounder than the rest, in order to resist the effort of the electric matter to escape, which is always the greatest at the greatest distance from the electric: and the other end should be furnished with several pointed wires or needles, either suspended from, or fixed to, an open metallic ring, and pointing to the globe or cylinder, in order to collect the fire. The prime conductor, instead of hanging on silken strings, which are liable to continual motion, should be supported by pillars of solid glass covered with sealing-wax or good varnish. The electrician should be provided with several metallic conductors of different sizes, which may be used as occasion requires. Prime conductors of a larger size are usually made of paste-board, covered with tin-foil or gilt paper: and these are useful for throwing off a longer and denser spark than those of a smaller size: they should terminate in a smaller knob or obtuse edge, at which the sparks should be solicited. Mr. Nairne prepared a conductor six feet in length, and twelve inches in diameter, from which he drew electrical sparks at the distance of sixteen,

seventeen, or eighteen inches. Dr. Van Marum still farther exceeded this, with a conductor of eight inches diameter, and upwards of twenty feet long, formed of different pieces, and applied to the larger electrical machines in Teyler's museum at Haerlem, the most powerful machine of the kind yet constructed. But the size of the conductor is always limited by that of the electric, there being a maximum which the size of the former should not exceed; for it may be so large, that the dissipation of the electricity from its surface may be greater than that which the electric is capable of supplying.

Dr. Priestley recommends a prime conductor of polished copper, in the form of a pear, supported by a pillar and a firm basis of baked wood: this receives its fire by a long arched wire of soft brass, which may be easily bent, and raised or lowered to the globe: it is terminated by an open ring, in which are hung some sharp-pointed wires. In the body of this conductor are holes for the insertion of metalline rods. This, he says, collects the fire perfectly well, and retains it equally every where. Phil. Trans. vol. lxiv. part i. art. 7. Hist. Elect. vol. ii. sect. 2.

Mr. Henly has contrived a new kind of prime conductor, which, from its use, is called the luminous conductor. It consists of a glass tube 18 inches long, and two inches diameter. The tube is furnished at both ends with brass caps and ferules about two inches long, cemented and made air-tight, and terminated by brass balls. In one of these caps is drilled a small hole, which is covered by a strong valve, and serves for exhausting the tube of its air. Within the tube at each end there is a knobbed wire, projecting to the distance of two inches and a half from the brass caps. To one of the balls is annexed a fine-pointed wire for receiving and collecting the electricity, and to the other a wire with a knob or ball for discharging it. The conductor, thus prepared, is supported on pillars of sealing-wax or glass. Beside the common purposes of a prime conductor to an electrical machine, this apparatus serves to exhibit and ascertain the direction of the electric matter in its passage through it. See a figure of this conductor in the Philos. Trans. with a description of experiments, &c. with it, vol. lxiv. pa. 403.

Conductors of lightning, are pointed metallic rods fixed to the upper parts of buildings, to secure them from strokes of lightning. These were invented and proposed by Dr. Franklin for this purpose, soon after the identity of electricity and lightning was ascertained; and they exhibit a very important and useful application of modern discoveries in this science. This ingenious philosopher, having found that pointed bodies are better fitted for receiving and throwing off the electric fire than such as are terminated by blunt ends or flat surfaces, and that metals are the readiest and best conductors, soon discovered that lightning and electricity resembled each other in this and other distinguishing properties: he therefore recommended a pointed metalline rod, to be raised some feet above the highest part of a building, and to be continued down into the ground, or the nearest water. The lightning, should it ever come within a certain distance of this rod or wire, would be attracted by it, and pass through it preferably to any other part of the building, and be conveyed into the earth or water, and there dissipated, without doing any damage to the building. Many facts have occurred to evince the utility of this simple and seemingly trifling apparatus. And yet some electricians, of whom Mr. Wilson was the chief, have objected to the pointed termination of this conductor; preferring rather a blunt end: because, they conceive a point invites the electricity from the clouds, and attracts it at a greater distance than a blunt conductor. Philos. Trans. vol. liv. pa. 234; vol. lxiii. pa. 49; and vol. lxviii. pa. 232.

This subject has indeed been very accurately examined and discussed; and pointed conductors are almost universally, and for the best reasons, recommended as the most proper and eligible. A sharp-pointed conductor, as it attracts the electric fire of a cloud at a greater distance than the other, draws it off gradually: and by conveying it away gently, and in a continued stream, prevents an accumulation and a stroke; whereas a conductor with a blunt termination receives the whole discharge of a cloud at once, and is much more likely to be exploded whenever a cloud comes within a striking distance. To this may be added experience; for buildings guarded by either natural or artificial conductors terminating in a point, have very seldom been struck by lightning; but others, having flat or blunt terminations, have often been struck and damaged by it.

One of the best conductors for this purpose is a rod of iron, or rather of copper, as being a better conductor of electricity, and less liable to rust, about three quarters of an inch thick, which is either to be fastened to the walls of a building by wooden cramps, or supported by wooden posts, at the distance of a foot or two from the wall; though less may do: the upper end of it should terminate in a pyramidal form, with a sharp point and edges; and, when made of iron, gilt or painted near the top, or else pointed with copper; and be elevated five or six feet above the highest part of the building, or chimneys, to which it may be fastened. The lower end is driven five or six feet into the ground, and directed away from the foundations of the building, or continued till it communicates with the nearest water: and if this part be made of lead, it will be less apt to decay. When the conductor is formed of different pieces of metal, care should be taken that they are well joined: and it is farther recommended, that a communication be made from the conductor by plates of lead, eight or ten inches broad, with the lead on the ridges and gutters, and with the pipes that carry down the rain water, which should be continued to the bottom of the building, and be

made to communicate either with water or moist earth, or with the main pipe which serves the house with water. If the building be large, two, three, or more conductors should be applied to different parts of it, in proportion to its extent. Philos. Trans. vol. lxiv. pa. 403.

Among the various contrivances which have been made to increase the power and effect of these lightning conductors, we are not acquainted with any which seem preferable to one invented by Mr. Robert Paterson, of Philadelphia: we shall describe it in his own words.

"From the instances which now and then occur of houses being struck with lightning that are furnished with metallic conductors, and the frequent instances of these conductors having their tops melted off by a stroke of lightning, it appears that this admirable contrivance for guarding houses against the dangerous effects of lightning is, in some degree, still imperfect. Some improvement seems yet to be wanting at both extremities of the rod: at the upper end, to secure it against the accident of being melted, which renders it afterwards unfit to answer its original intention, viz. drawing off the electric fluid or lightning, from the passing cloud, in a silent, imperceptible manner, for it is only pointed conductors that possess this property: and at the lower extremity, to afford a more ready passage for the fluid into the surrounding earth.

"The first of these intentions would, I am persuaded, be effectually answered by inserting in the top of the rod a piece of black-lead, of about two inches long, taken out of a good pencil, and terminating in a fine point, projecting but a very little above the end of its metallic socket; so that, if the black-lead point should happen to be broken off (of which, however, I think there can be but little danger), still the point of the rod would be left sharp enough to answer the purpose of a metallic conductor.

"This substance is well known to be infusible by the greatest heat, and hence its use in making crucibles; nor is it evapourable, as remarked by Cronstedt, in his Mineralogy (sect. 231.), except by a slow, calcining heat, to which it would never be exposed on the top of a lightning rod.

"At the same time its power as a conductor of electricity is, perhaps, equal, or but little inferior, to that of any of the metals. A line drawn on a piece of paper by a black-lead pencil will, as I have often experienced, conduct an electric explosion seemingly as well as a similar line of gilding would do, and that without ever losing its conducting power, which is not the case with gilding.

"The second intention is, to facilitate the escape of the electric fluid from the lower part of the rod into the surrounding earth. It is in many cases impracticable, from the interruption of rocks or other obstacles, to sink the rod so deep as to reach moist earth, or any other substance, which is a tolerably good conductor of electricity. Nor, even if this were practicable, would it, I presume, be alone sufficient to answer the desired intention. Iron buried in the earth, especially in moist earth, will presently contract a coat of rust, which will continually increase till the whole is converted into rust; but, rust of iron, and indeed the calx of all metals, is a non-conductor, or at most, but a very imperfect conductor of the electric fluid. Hence it is very easy to see, that, in a few years after a lightning rod has been erected, that part of it which is under ground will contribute little or nothing towards the safety of the building. Besides, the surface of this part of the rod is too small to afford an easy and copious discharge of the electric fluid into the surrounding earth, when this is but an imperfect conductor.

"As a remedy for these defects, I would propose that a part of the rod under ground be made of tin, or copper, which are far less liable to corrosion or rust, by lying under ground, than iron. Or, which perhaps would answer the purpose better, let this part of the rod, of whatever metal it be made, be coated over with a thick crust of black-lead, previously formed into the consistence of paste, by being pulverized and mixed with melted sulphur (as in the manufactory of the ordinary kind of black-lead pencils), and then applied to the rod while hot. By this mean the lower part of the rod would, I apprehend, retain its conducting power for ages without any diminution.

"In order to increase the surface of the lower part of the conductor, let a hole or pit, of sufficient extent, be dug as deep as convenient, and into this pit let there be put a quantity of charcoal round the lower extremity of the rod. Charcoal possesses two properties; which in a peculiar manner fit it for answering the purpose here in view. First, it is a very good conductor of electricity; and, secondly, it will undergo little or no change of property by lying ever so long in the earth. Thus might the surface of that part of the conductor in contact with the earth be increased, with little trouble or expence, to any extent at pleasure; a circumstance which every one acquainted with electrical experiments must acknowledge to be of great importance to the end here proposed." Repertory of Arts, &c. vol. i. pa. 114. See farther ELECTRICITY and GALVANISM.

CONDUCTOR. *s.* (from *conduct.*) 1. A leader; one who shows another the way by accompanying him (*Dryden*). 2. A chief; a general (*Shakspeare*). 3. A manager; a director (*Addison*). 4. An instrument to direct the knife in cutting for the stone (*Quincy.*)

CONDU'CTRESS. *s.* (from *conduct.*) A woman that directs.

CO'NDUIT. *s.* (*conduit*, French.) 1. A canal of pipes for the conveyance of waters; an aqueduct (*Davies*). 2. The pipe or cock at which water is drawn (*Shakspeare*).

CONDUPLICATE. In botany, doubled together. Conduplicata vernatio foliatio. A

term in vernation or leafing; signifying, that in the bud, the two sides of the leaf are doubled over each other at the midrib. As in rose, ash, walnut, almond, cherry, oak, beech, &c. It is used also in the sleep of plants (conduplicans somnus) in the same sense: when the leaves, during the night, fold together, like the leaves of a book.

CONDUPLICATION. *s.* (*conduplicatio*, Latin.) A doubling; a duplicate.

CONDUR, or CONDORE. See VULTUR.

CONDYLE. (*condylus*, κονδυλος; from κονδυ, an ancient cup shaped like a joint). A rounded eminence of a bone in any of the joints.

CONDYLOMA. (*condyloma*, κονδυλαμα; from κονδυλος, a tubercle or knot). Sarcoma. —A soft, wart-like excrescence, that arises about the anus and pudendum of both sexes. There are several species of condylomata, which have received names from their appearances, as ficus, cristæ, tymus, from their resemblance to a fig, &c.

CONE, a kind of round pyramid, or a solid body having a circle for its base, and its sides formed by right lines drawn from the circumference of the base to a point at top; being the vertex or apex of the cone.

Euclid defines a cone to be a solid figure, whose base is a circle, and is produced by the entire revolution of a right-angled triangle about its perpendicular leg, called the axis of the cone. If this leg, or axis, be greater than the base of the triangle, or radius of the circular base of the cone, then the cone is acute-angled, that is, the angle at its vertex is an acute angle; but if the axis be less than the radius of the base, it is an obtuse-angled cone; and if they are equal, it is a right-angled cone.

But Euclid's definition only extends to a right cone, that is, to a cone whose axis is perpendicular or at right-angles to its base; and not to oblique ones, in which the axis is oblique to the base, the general definition, or description of which may be this: If a line VA (Pl. 48.) continually pass through the point V, turning upon that point as a joint, and the lower part of it be carried round the circumference ABC of a circle; then the space inclosed between that circle and the path of the line is a cone. The circle ABC is the base of the cone; V is its vertex; and the line VD, from the vertex to the centre of the base, is the axis of the cone. Also the other part of the revolving line produced above V, will describe another cone V*acb*, called the opposite cone, and having the same common axis produced DV*d*, and vertex V.

Properties of the Cone.—1. The area or surface of every right cone, exclusive of its base, is equal to a triangle whose base is the periphery, and its height the slant side of the cone. Or, the curve superficies of a right cone, is to the area of its circular base, as the slant side is to the radius of the base. And therefore, the same curve surface of the cone is equal to the sector of a circle whose radius is the slant side, and its arch equal to the circumference of the base of the cone.

2. Every cone, whether right or oblique, is equal to one-third part of a cylinder of equal base and altitude; and therefore the solid content is found by multiplying the base by the altitude, and taking one-third of the product; and hence also all cones of the same or equal base and altitude, are equal.

3. Although the solidity of an oblique cone be obtained in the same manner with that of a right one, it is otherwise with regard to the surface, since this cannot be reduced to the measure of a sector of a circle, because all the lines drawn from the vertex to the base are not equal. (See a Memoir on this subject, by M. Euler, in the Nouv. Mem. de Petersburgh, vol. i.) Dr. Barrow has demonstrated, in his Lectiones Geometricæ, that the solidity of a cone with an elliptic base, forming part of a right cone, is equal to the product of its surface by a third part of one of the perpendiculars drawn from the point in which the axis of the right cone intersects the ellipse; and that it is also equal to one-third of the height of the cone multiplied by the elliptic base: consequently that the perpendicular is to the height of the cone, as the elliptic base is to the curve surface.

4. The curve surface of the frustum of a cone, is found by multiplying half the sum of the circumferences of the two ends, by the slant side.

5. The solidity of a conic frustum, is found by adding into one sum the areas of the two ends, and the mean proportional between them; then multiply that sum by the perpendicular height, and one-third of the product will be the solidity.

CONES OF THE HIGHER KINDS, are those whose bases are circles of the higher kinds; and are generated by supposing a right line fixed in a point, on high, though conceived capable of being extended more or less, on occasion; and moved or carried round a circle.

CONE OF RAYS, in optics, includes all the several rays which fall from any point of a radiant, on the surface of a glass.

CONE, or SPINDLE, (Double), in mechanics, is a solid formed of two equal cones joined at their bases. If this be laid on the lower part of two rulers, making an angle with each other, and elevated in a certain degree above the horizontal plane, the cones will roll upwards towards the raised ends, and seem to ascend, though in reality the centre of gravity is descending lower.

CONE. (*conus*). In botany, the fruit of several ever-green trees, as fir, pine, cedar, cypress. Linnéus has discarded this term, and has adopted that of Strobilus, which however is of more extensive signification; comprehending fruits, as of magnolia, not called cones in common language. See STROBILUS.

A cone is broadest at the base, or next the point of union with the branch, and tapers more or less to the end. It is composed of woody scales, usually opening, and has a seed at the base of each scale. Though Linnéus has discarded the term cone, he has retained an order of coniferous plants.

CONESSI BARK. See Conessi cortex.

Conessi cortex. (*conessi*, Malabrens). Codago-pala. Cortex profluvii. The bark of the nerium antidysentericum; foliis ovatis, acuminatis, petiolatis, of Linnéus. It grows on the coast of Malabar. It is of a dark black colour externally, and generally covered with a white moss or scurf. It is very little known in the shops; has an austere, bitter taste; and is recommended in diarrhœas, dysenteries, &c. as an adstringent. See Nerium.

To CONFA'BULATE. *v. n.* (*confabulo*, Latin.) To talk easily together; to chat.

CONFABULA'TION. *s.* (*confabulatio*, Latin.) Easy conversation.

CONFA'BULATORY. *a.* (from *confabulate.*) Belonging to talk or prattle.

CONFARREATION, a ceremony among the ancient Romans used in the marriage of persons whose children were destined for the priesthood. It consisted in the offering up of some pure white wheaten bread, and rehearsing a certain formula in the presence of ten witnesses.

To CONFE'CT. *v. a.* (*confectus*, Latin.) To make up into sweetmeats.

Co'nfect. *s.* A sweetmeat (*Harvey*).

CONFE'CTION. *s.* (*confectio*, Latin.) 1. A preparation of fruit, or juice of fruit, with sugar; a sweetmeat (*Addison*). 2. A composition; a mixture (*Shakspeare*).

CONFECTIO AROMATICA. Confectio cardiaca. This is an excellent medicine, possessing stimulant, antispasmodic, and adstringent virtues; and is exhibited, with these views, to children and adults in a vast variety of diseases, mixed with other medicines.

Confectio cardiaca. See Confectio aromatica.

Confectio opiata. Philonium Londinense. This very warm and stimulating confection is admirably calculated to relieve diarrhœas, spasms of the stomach and bowels, and is frequently ordered as a nervine, stimulant and adstringent.

CONFE'CTIONARY. *s.* (from *confection.*) One whose trade is to make sweetmeats (*Shakspeare*).

CONFE'CTIONER. *s.* (from *confection.*) One whose trade is to make sweetmeats (*Boyle*).

CONFECTOR, among the ancient Romans, a gladiator hired to fight with beasts in the amphitheatre.

CONFE'DERACY. *s.* (*confederation*, Fr.) A league; a contract by which several engage to support each other; union; federal compact (*Shakspeare*)

To CONFE'DERATE. *v. a.* (*confederer*, French.) To join in a league; to unite; to ally (*Knolles*).

To Confe'derate. *v. n.* To league; to unite in a league (*South*).

Confe'derate. *a.* (from the verb.) United in a league (*Psalms*).

Confe'derate. *s.* (from the verb.) One who engages to support another; an ally (*Dryden*).

CONFEDERATION. *s.* (*confederation*, French.) League; alliance (*Bacon*).

To CONFE'R. *v. n.* (*confero*, Latin.) To discourse with another upon a stated subject; to converse solemnly (*Clarendon*).

To Confe'r. *v. a.* 1. To compare (*Boyle*). 2. To give; to bestow (*Clarendon*). 3. To contribute; to conduce (*Glanville*).

CO'NFERENCE. *s.* (*conference*, French.) 1. Formal discourse; oral discussion of any question (*Sidney*). 2. An appointed meeting for discussing some point by personal debate. 3. Comparison (*Ascham*).

CONFE'RRER. *s.* (from *confer.*) 1. He that converses. 2. He that bestows.

CONFERVA. In botany, a genus of the class cryptogamia, order algæ. Herbaceous tubes or fibres, mostly separated internally by transverse positions; seeds scattered through the joints or produced in solitary closed tubercles attached to the fibres. A hundred and six species, chiefly found on stones, in slow streams, on the sides of cisterns, or the surface of ponds. Some of these have simple filaments; some branched. C. rivularis has been recommended in some dispensatories in cases of spasmodic asthma, phthisis, &c. on account of the great quantity of oxygen it contains.

Numerous as is the family of the confervas, there is scarcely an individual that, upon minute examination, does not appear to be highly elegant and beautiful. We have selected the following, which are all natives of our own country, as the subject of a distinct plate which the reader will find marked Botany LXIX.

1. C. biddulphiana; so named by Dr. Smith in honour of Miss S. Biddulph, who discovered it towards the close of 1807 near Southampton, entangled with every marine production of the season. Colour pale-green; filaments capillary, simple, somewhat compressed: joints quadrangular, longitudinally striated; at length separating at one of their edges and devaricated.

2. C. castanea. Creeping chesnut coloured conferva. For the first notice of this species we are indebted to Mr. Dillwyn, who discovered it on hedge banks in a lane on a high hill between the Gower and Zongher roads, about four miles from Swansea. It has also been found by Miss S. Biddulph near Southampton growing among hypnum molluscum. Its colour chesnut-brown; filaments creeping, branched, entangled, alternately bipinnate: branches divaricated, tapering, acute; joints elongated, even. It creeps in loose entangled patches, not only among mosses, but over dead stalks, and sticks, stones and earth. The creeping stem throws off many alternate, procumbent, curved branches, which are twice or thrice subdivided in a pinnate but alternate manner, their ultimate divisions being acute, and all of them standing nearly at right angles with the branch from which they spring. Fructification unknown.

3. C. nigrescens. Blackish, compound jointed conferva. Blackish; much, and alternately branched; the ultimate branches short, crowded awl-shaped: joints broad rather than long,

BOTANY.

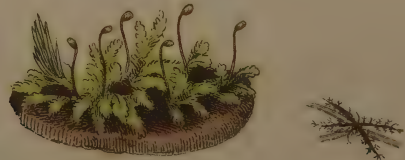
PL. LXIX.

CONFERVA

C. Biddulphiana.
Disjointed Marine Conferva.

C. lichenicola.
Red Lichen Conferna.

C. nigrescens.
Blackish Compound-jointed Conferva.



C. castanea.
Creeping Chesnut-coloured Conferva.

Drawn from Nature by S. Edwards.
London, Publish'd by Geo. Kearsley, Fleet Street, Jan. 1. 1809.

compound. Common to Devonshire and Cornwall, and many parts of the British coast. Fructification in small lateral nodules.

4. C. lichenicola. Red lichen conferva. Red: filaments upright, crowded, alternately branched, roughish: joints swelling, nearly as broad as they are long. It is doubly parasitic; being found on the *lichen Turneri inclusus*, (whence its specific name) which lichen is itself parasitic to the beech trees of the New Forest. It appears to the naked eye like brick-dust scattered over the crust of the lichen. No fruit has yet been detected.

To CONFE'SS. *v. a.* (*confesser*, French.) 1. To acknowledge a crime (*Shakspeare*). 2. To disclose the state of the conscience to the priest (*Wake*). 3. To hear the confession of a penitent, as a priest. 4. To own; to avow; not to deny (*Matthew*). 5. To grant; not to dispute (*Locke*) 6. To show; to prove; to attest (*Pope*).

To CONFE'SS. *v. n.* To make confession; to disclose; to reveal.

CONFE'SSEDLY. *ad.* (from *confessed.*) Avowedly; indisputably; undeniably (*South*).

CONFE'SSION. *s.* (from *confess.*) 1. The acknowledgment of a crime (*Temple*). 2. The act of disburdening the conscience to a priest (*Wake*). 3. Profession; avowal (*Shakspeare*). 4. A formulary in which the articles of faith are comprised.

CONFE'SSIONAL. *s.* (French.) The seat or box in which the confessor sits to hear the declarations of his penitents (*Addison*).

CONFE'SSIONARY. *s.* (*confessionaire*, French.) The seat where the priest sits to hear confessions.

CONFE'SSOR. *s.* (*confesseur*, French.) 1. One who makes professions of his faith in the face of danger (*Stillingfleet*). 2. He that hears confessions, and prescribes rules of penitence (*Taylor*). 3. He who confesses his crimes.

In ecclesiastical history, we frequently find the word confessors used for martyrs: in after times, it was confined to those who, after having been tormented by the tyrants, were permitted to live and die in peace. And at last it was also used for those who, after having lived a good life, died under an opinion of sanctity.

CONFE'ST. *a.* Open; known; not concealed; apparent (*Rowe*).

CONFE'STLY. *ad.* Indisputably; evidently; without concealment (*Decay of P.*).

CONFI'CIENT. *a.* (*conficiens*, Lat.) That causes or procures; effective.

CO'NFIDANT. *s.* (*confident*, Fr.) A person trusted with private affairs (*Arbuthnot*).

To CONFI'DE. *v. n.* (*confido*, Latin.) To trust in; to put trust in (*Congreve*).

CO'NFIDENCE. *s.* (*confidentia*, Latin.) 1. Firm belief of another; reliance (*South*). 2. Trust in his own abilities; security (*Clar.*). 3. Vitious boldness; false opinion of his own excellencies (*Hooker*), 4. Consciousness of innocence; honest boldness; firmness of integrity (*Milton*). 5. That which gives or causes confidence.

CO'NFIDENT. *a.* (from *confide.*) 1. Assured beyond doubt (*Hammond*). 2. Positive, affirmative; dogmatical. 3. Secure of success (*South*). 4. Void of suspicion; trusting without limits (*Shakspeare*). 5. Bold to vice; impudent.

CO'NFIDENT. *s.* (from *confide.*) One trusted with secrets (*South*).

CO'NFIDENTLY. *ad.* (from *confident.*) 1. Without doubt; without fear of miscarriage (*Atterbury*). 2. With firm trust (*Dryden*). 3. Without appearance of doubt; positively; dogmatically (*Ben Jonson*).

CO'NFIDENTNESS. *s.* (from *confident.*) Assurance.

CONFIGURA'TION. *s.* (*configuration*, French.) 1. The form of the various parts adapted to each other (*Woodward*). 2. The face of the horoscope.

To CONFI'GURE. *v. a.* (from *figura*, Latin.) To dispose into any form (*Bentley*).

CO'NFINE. *s.* (*confinis*, Latin.) Common boundary; border; edge (*Locke*).

CO'NFINE. *a.* (*confinis*, Latin.) Bordering upon.

To CONFI'NE. *v. n.* To border upon; to touch on other territories (*Milton*).

To CONFI'NE. *v. a.* (*confiner*, French.) 1. To bound; to limit. 2. To shut up; to imprison (*Shakspeare*). 3. To restrain; to tie up to (*Dryden*).

CONFI'NELESS. *a.* (from *confine.*) Boundless; unlimited (*Shakspeare*).

CONFI'NEMENT. *s.* (from *confine.*) Imprisonment; restraint of liberty (*Addison*).

CONFI'NER. *s.* (from *confine.*) 1. A borderer; one that lives upon confines. 2. A near neighbour (*Wotton*). 3. One which touches upon two different regions (*Bacon*).

CONFI'NITY. *s.* (*confinitas*, Lat.) Nearness; neighbourhood; contiguity.

To CONFI'RM. *v. a.* (*confirmo*, Latin.) 1. To put past doubt by new evidence (*Addison*). 2. To settle; to establish (*Shakspeare*). 3. To fix; to radicate (*Wiseman*). 4. To complete; to perfect (*Shakspeare*). 5. To strengthen by new solemnities or ties (*Swift*). 6. To settle or strengthen in resolution, or purpose, or opinion (*Milton*). 7. To admit to the full privileges of a christian, by imposition of hands (*Hammond*).

CONFI'RMABLE. *a.* (from *confirm.*) Capable of incontestable evidence (*Brown*).

CONFIRMA'TION. *s.* (from *confirm.*) 1. The act of establishing any thing or person; settlement (*Shakspeare*). 2. Evidence; additional proof (*Knolles*). 3. Proof; convincing testimony (*South*). 4. An ecclesiastical rite (*Hammond*).

In the latter sense the word is used to denote the ceremony of laying on of hands for the conveyance of the Holy Ghost.

Among the ancients in the time of Tertullian (for we have no mention of it earlier), it was conferred upon adults immediately after their baptism; and was esteemed, in some measure, to be a part thereof: whence the fathers call it the accomplishment of baptism. The ground of the practice was an opinion of

the imperfection of baptism, which in their apprehension only prepared persons for the reception of the graces of the Holy Spirit, which were actually conferred in confirmation. Tertull. de Bapt. p. 599, &c. and Lord King's Hist. of the Prim. Church, chap. v. p. 80, &c.

Among the Greeks, and throughout the East, it still accompanies baptism; but the Romanists make it a distinct independent sacrament.

It has been alleged, that, as confirmation always succeeded baptism, and made a necessary part of it, and several of the primitive Christians esteemed both necessary to salvation, it must have been performed by presbyters as well as by bishops; because the bishop of a church might be absent for a very considerable time, as was the case with Cyprian, or the see might be vacant: and as presbyters baptised, it is reasonable to conclude that they also confirmed. Lord King has shewn that confirmation and absolution were the same thing; and that presbyters, sometimes with the bishop, and sometimes without the bishop, did absolve by imposition of hands: and he has cited several ancient authorities in order to prove, that confirmation was frequently repeated with respect to the same persons. Hist. Prim. Church, p. 91, &c.

The text usually urged in favour of confirmation is Acts, viii. 14. Yet this is by no means a sufficient authority for the practice: for, as Dr. Whitby justly observes, if the apostles laid not their hands on all who were baptised, it makes nothing for confirmation; if they did, then Simon Magus also was confirmed, and received the Holy Ghost, which none will admit very readily. The principal arguments in favour of the rite are adduced by bishop Pretyman in his Elements of Christian Theology, vol. ii. p. 416: the chief objections, in Towgood's Dissenting Gentleman's Letters, pp. 36, 141.

Confirmation, in rhetoric, the third part of an oration, wherein the orator undertakes to prove the truth of the proposition advanced in his narration; and is either direct or indirect.

Direct confirms what he has to urge for strengthening his own cause. Indirect, properly called confutation, tends to refute the arguments of his adversaries.

CONFIRMA'TOR. *s.* An attester; he that puts a matter past doubt (*Brown*).

CONFI'RMATORY. *a.* (from *confirm.*) Giving an additional testimony.

CONFI'RMEDNESS. *s.* (from *confirmed.*) Confirmed state; radication (*D. of Decay*).

CONFI'RMER. *s.* (from *confirm.*) One that confirms; an attester; an establisher (*Shakspeare*).

CONFI'SCABLE. *a.* (from *confiscate.*) Liable to forfeiture.

To CONFI'SCATE. *v. a.* (*confisquer*, Fr.) To transfer private property to the publick, by way of penalty for an offence (*Bacon*).

Confi'scate. *a.* (from the verb.) Transferred to the publick as forfeit (*Shakspeare*).

CONFISCA'TION. *s.* (from *confiscate.*) The act of transferring the forfeited goods of criminals to publick use (*Bacon*).

CO'NFITENT. *s.* (*confitens*, Latin.) One confessing (*Decay of Piety*).

CO'NFITURE. *s.* (French.) A sweetmeat; a confection; a comfit (*Bacon*).

To CONFI'X. *v. a.* (*confixum*, Latin.) To fix down; to fasten (*Shakspeare*).

CONFLA'GRANT. *a.* (*conflagrans*, Lat.) Involved in a general fire (*Milton*).

CONFLAGRA'TION. *s.* (*conflagratio*, Latin.) A general fire. This word is commonly applied to that grand period or catastrophe of our world, when it is to be destroyed by fire, according to the predictions of Scripture. When as St. Peter expresses it, "The day of the Lord will come as a thief in the night; in the which the heavens shall pass away with a great noise, and the elements shall melt with fervent heat, the earth also and the works that are therein shall be burned up." 2 Peter III. 10.

CONFLA'TION *s.* (*conflatum*, Latin.) 1. The act of blowing many instruments together (*Bacon*). 2. A casting or melting of metal.

CONFLE'XURE *s.* (*conflexura*, Lat.) A bending.

To CONFLI'CT. *v. n.* (*confligo*, Latin.) To strive; to contest; to fight; to struggle (*Tillotson*).

Co'nflict. *s.* (*conflictus*, Latin.) 1. A violent collision, or opposition of two substances (*Boyle*). 2. A combat; a fight between two (*Shakspeare*). 3. Contest; strife; contention (*Shakspeare*). 4. Struggle; agony; pang (*Rogers*).

CO'NFLUENCE. *s* (*confluo*, Latin.) 1. The junction of several streams (*Raleigh*) 2. The act of crowding to a place (*Bacon*). 3. A concourse; a multitude (*Temple*). 4. Collection; concurrence (*Boyle*).

CO'NFLUENT. *a.* (*confluens*, Latin.) Running one into another; meeting (*Blackmore*).

Confluent small pox. See Variola confluens.

Confluent leaves. In botany. (*folia confluentia*). Thronging; united at the base: growing in tufts, so as to leave the intermediate parts of the stem bare. Confluent lobes; running one into another: in opposition to distinct.

CO'NFLUX. *s.* (*confluxio*, Latin.) 1. The union of several currents (*Clarendon*). 2. Crowd; multitude collected (*Milton*).

CONFO'RM. *a.* (*conformis*, Lat.) Assuming the same form; resembling (*Bacon*).

To Confo'rm. *v. a.* (*conformo*, Latin.) To reduce to the like appearance, shape, or manner with something else (*Hooker*).

To Confo'rm. *v. n.* To comply with (*Dryden*).

CONFO'RMABLE. *a.* (from *conform.*) 1. Having the same form; similar (*Hooker*). 2. Agreeable; suitable; consistent (*Addison*). 3. Compliant; ready to follow directions; submissive; obsequious (*Sprat*).

CONFO'RMABLY. *ad.* (from *conformable.*) With conformity; suitably (*Locke*).

CONFORMA'TION. *s.* (*conformatio*, Lat.) 1. The form of things, as relating to each other (*Holder*). 2. The act of producing suitableness, or conformity to any thing (*Watts*).

CONFO'RMIST. *s.* (from *conform.*) One that complies with the worship of the church of England: not a dissenter (*Dunton*).

CONFO'RMITY. *s.* (from *conform.*) 1. Similitude; resemblance (*Hooker*). 2. Consistency (*Arbuthnot*).

CONFORTA'TION. *s.* (from *conforto*, Latin.) Collation of strength; corroboration (*Bacon*).

To CONFO'UND. *v. a.* (*confondre*, Fr.) 1. To mingle things so that their several natures cannot be discerned (*Genesis*). 2. To perplex; to compare or mention without due distinction (*Locke*). 3. To disturb the apprehension by indistinct words or notions (*Locke*). 4. To throw into consternation; to terrify; to astonish; to stupify (*Milton*). 5. To destroy; to overthrow (*Daniel*).

CONFO'UNDED. *part. a.* Hateful; detestable; enormous; odious (*Grew*).

CONFO'UNDEDLY. *ad.* Hatefully; shamefully: a low word (*L'Estrange*).

CONFO'UNDER. *s.* (from *confound.*) He who disturbs, perplexes, terrifies, or destroys.

CONFRATE'RNITY. *s.* (*con* and *fraternitas*, Latin.) A brotherhood; body of men united for some religious purpose (*Stilling.*).

CONFRICA'TION. *s.* (*con* and *frico*, Latin.) The act of rubbing against any thing (*Bacon*).

To CONFRO'NT. *v. a.* (*confronter*, Fr.) 1. To stand against another in full view; to face (*Dryden*). 2. To stand face to face, in opposition to another (*Hooker*). 3. To oppose one evidence to another (*Sidney*). 4. To compare one thing with another (*Addison*).

CONFRONTA'TION. *s.* (Fr.) The act of bringing two evidences face to face.

CONFUCIUS, or KONG-FU-TSE, a Chinese philosopher, who lived about 500 years before our Saviour's birth, in the kingdom of Lu, now called the province of Xantung. His wit and judgment got him a reputation from his very youth; and being a mandarin, and employed in the government of the kingdom of Lu, his profound knowledge of morals and politics made him be greatly admired. Notwithstanding his care, his prince's court was much disordered; and Confucius finding the king would not listen to his advice, quitted the court, and taught moral philosophy with such applause that he soon had above 3000 scholars, whereof 72 surpassed the rest in learning and virtue, for whom the Chinese have still a particular veneration. He divided his doctrine into four parts, and his scholars into four classes: the first order was of those who studied to acquire virtue; the second those who learned the art of reasoning well; the third studied the government of the state and the duty of magistrates; the fourth were wholly taken up in noble discourses of all that concerned morals. In spite of all his pains to establish pure morality and religion, he was nevertheless the innocent cause of their corruption. It is said, that when he was complimented upon the excellency of his philosophy, he replied, that he fell greatly short of the perfect degree of virtue: but that in the west the most holy was to be found. This made a strong impression on the learned; and in the 66th year after Christ's birth, the emperor Mon-ti sent ambassadors toward the west to seek this holy man. They stopped at an island near the Red sea, and found a famous idol named Fohi, representing a philosopher that lived 500 years before Confucius. They carried this idol back with them, with instructions concerning the worship rendered to it; and so introduced a superstition that abolished in several places the maxims of Confucius. His tomb is in the academy where he taught, near the town Xio-fu, upon the banks of the river Xu. This philosopher has been in great veneration in China above 2000 years; and is still so esteemed, that each town has a palace consecrated to his memory.

To CONFU'SE. *v. a.* (*confusus*, Latin.) 1. To disorder; to disperse irregularly (*Milton*). 2. To mix, not separate (*Milton*). 3. To perplex; to obscure (*Watts*). 4. To hurry the mind (*Pope*).

CONFU'SEDLY. *ad.* (from *confused.*) 1. In a mixed mass; without separation (*Ral.*). 2. Indistinctly; one mixed with another (*Pope*). 3. Not clearly; not plainly (*Claren.*). 4. Tumultuously; hastily (*Dryden*).

CONFU'SEDNESS. *s.* (from *confused.*) Want of distinctness; want of clearness (*Norris*).

CONFU'SION. *s.* (from *confuse.*) 1. Irregular mixture; tumultuous medley. 2. Tumult; disorder (*Hooker*). 3. Indistinct combination (*Locke*). 4. Overthrow; destruction (*Shakspeare*). 5. Astonishment; distraction of mind (*Spectator*).

CONFUSION OF LANGUAGES, in the history of the world, a memorable event, which happened in the 101st year (according to the Hebrew chronology) after the flood: B.C. 2247, at the overthrow of Babel, in order to make mankind separate and divide themselves into different nations.

It has been much disputed whether there were more languages than one before the flood; and many arguments have been adduced by learned men on both sides. This question, however, it is easy to see, can never be determined; but whether it was so or not, it is plain there must have been but one for some time after the flood, as all mankind were descended from one family. As to the confusion of tongues and dispersion of mankind, it is an event mentioned by profane as well as the sacred historians. They write that mankind used one and the same language till the overthrow of the tower of Babylon; at which time a multiplicity of tongues was introduced by the gods: whereupon wars ensued, and those whose speech happened to be intelligible to one another,

joined company, and seized the countries they chanced to light upon.

With regard to the manner, however, in which this confusion was effected, there is a great variety of sentiments. Several learned men, prepossessed with an opinion that all the different idioms now in the world did at first arise from one primitive language to which they may be reduced, and that the variety which we find among them is no other than what must naturally have taken place in so long course of time, have thence been induced to believe that there were no new languages formed at the confusion, but that the most that was done at that time was only to set the builders of Babel at variance with one another by creating a misunderstanding among them. This some imagine to have been effected without any immediate influence on their language; which seems contrary to the words and obvious intention of the sacred historian. Others have imagined it brought about by a temporary confusion of their speech, or rather of their apprehensions, causing them, while they continued together, and spake the same language, yet to understand the words differently. A third opinion is, that a variety of inflexions was introduced, and perhaps some new words, which disturbed and prevented the former manner of expression. But this, though it might occasion different dialects, yet could not create new languages; and seems not to answer the intention of Moses, which was to inform us not only how mankind were at first dispersed into so many nations, but to account for their different languages; a thing very difficult if not impossible to be done, without having recourse to the immediate interposition of divine power. For though time, intercourse with foreign nations, commerce, the invention and improvement of arts and sciences, and the difference of climates, cause very considerable alteration in languages, yet the utmost effect we can imagine them to have will not come up to the point in question. Upon the whole, therefore, it seems most probable, that on the confusion at Babel there were new languages formed; and that these languages were the roots of all others that are, that have been, or that will be spoken while the world remains.

In what manner these new languages were formed, is a matter not easy to be determined. From the manner in which this event is related by Moses, some have concluded God effected it by immediately inducing an oblivion of their former tongue, and instantaneously infusing others into their minds. The Jews imagined this to be done by the ministry of angels, seventy of whom descended with God, and were each of them set over a nation, to whom they taught a peculiar language; but that the ancestors of the Jewish nation retained the primitive language. Others have supposed, that God did no more than cause them to forget their old language, leaving them to form new ones in the best manner they could: but this must have taken up some time, and could but ill have answered the necessities of mankind; and the way in which Moses expresses himself seems to imply that it was done instantaneously. See farther on this subject M. Saurin's tenth Dissertation, and Delany's Revelation examined with Candour.

Some writers, however, contend that it does not appear from Scripture that there was any confusion of tongues at all at Babel. This opinion is defended by the learned Vitringa in the first vol. of his Observationes Sacræ, cap. 8. and in his Disquisitions. Also by Hutchinson, and by Mr. Parkhurst the lexicographer in an ingenious letter preserved in the Gentleman's Magazine, for August 1797. Yet to support this hypothesis, it appears to us necessary to put an unnatural force on the construction of the Hebrew text. The confusion of *tongues* seems to be the first idea that would strike the mind of a reader. The novel interpretation may obviate some difficulties; but it creates others which in our estimation are more formidable.

CONFU'TABLE. *a.* (from *confute.*) Possible to be disproved (*Brown*).

CONFUTA'TION. *s.* (*confutatio*, Latin.) The act of confuting; disproof (*Bentley*).

To CONFU'TE. *v. a.* (*confuto*, Latin.) To convict of errour; to disprove (*Hudibras*).

CONG, a town of China, of the third rank, in the province of Honan; fifteen miles S. Hoai-king.

Cong, a town of China, of the third rank, in the province of Se-tchuen: twenty-five miles S. Soui-tcheou.

CO'NGE. *s.* (*congé*, French.) 1. Act of reverence; bow; courtesy (*Swift*). 2. Leave; farewell (*Spenser*).

Conge, in architecture, a moulding in form of a quarter round, or a cavetto, serving to separate two members from one another; such is that which joins the shaft of the column to the cincture, called also apophyge.

Conge d'elire, is the king's permission royal to a dean and chapter, in time of a vacancy, to choose a bishop. See Canon, and Collation.

Gwyn observes, that the king of England, as sovereign patron of all bishoprics and other benefices, had anciently the free appointment of all ecclesiastical dignities; investing, first, per baculum et annulum; and afterwards by letters patent: but that, in process of time, he made the election over to others, under certain forms and conditions; as, that they should at every vacancy, before they chose, demand of the king congé d'élire, i. e. leave to proceed to election; and after election to crave his royal assent, &c. He adds, that king John was the first who granted this; which was afterwards confirmed by stat. Westm. 3 Edw. I. c. 1. and again in the Articuli Cleri, 25 Edw. III. c. 1.

As the matter now stands we believe the dean and chapter have leave to choose, but not to refuse, the person recommended to them to fill the vacant bishopric.

To Co'nge. *v. n.* To take leave (*Shak.*).

To CONGE'AL. *v. a.* (*congelo*, Latin.) 1. To turn, by frost, from a fluid to a solid state (*Spenser*). 2. To bind or fix, as by cold (*Sh.*).

To CONGE'AL. *v. n.* To concrete; to gather into a mass by cold (*Burnet*).

CONGE'ALMENT. *s.* (from *congeal.*) The clot formed by congelation (*Shakspeare*).

CONGE'LABLE. *a.* (from *congeal.*) Susceptible of congelation (*Bacon*).

CONGELA'TION. *s.* (from *congeal.*) 1. Act of turning fluids to solids by cold (*Arb.*). 2. State of being congealed (*Brown*).

CONGELATION may be defined the transition of a liquid into a solid state, in consequence of an abstraction of heat: thus metals, oil, water, &c. are said to congeal when they pass from a fluid into a solid state. With regard to fluids, congelation and freezing meaning the same thing. Water congeals at 32°, and there are few liquids that will not congeal, if the temperature be brought sufficiently low. The only difficulty is to obtain a temperature equal to the effect; hence it has been inferred that fluidity is the consequence of caloric. (See FLUIDITY.) Every particular kind of substance requires a different degree of temperature for its congelation, which affords an obvious reason why particular substances remain always fluid, while others remain always solid, in the common temperature of the atmosphere, and why others are sometimes fluid, and at others solid, according to the vicissitudes of the seasons, and the variety of climates. See COLD, FREEZING, ICE.

For an interesting history of the congelation of quicksilver, by sir Charles Blagden, see Phil. Transac. vol. lxxiii. p. 829, or new Abridgment, part 59, p. 331—453.

CONGE'NER. *s.* (Latin.) A thing of the same kind or nature (*Miller*).

CONGE'NEROUS. *a.* (*congener*, Latin.) Of the same kind (*Arbuthnot*).

CONGE'NEROUSNESS. *s.* The quality of being from the same original.

CONGE'NIAL. *a.* (*con* and *genius*, Lat.) Partaking of the same genius; cognate (*Pope*).

CONGENIA'LITY. *s.* (from *congenial.*) Cognation of mind, or nature.

CONGE'NITE. *a.* (*congenitus*, Latin.) Of the same birth; connate (*Hale*).

CONGER, in ichthyology. See MURÆNA.

CONGE'RIES. *s.* (Latin.) A mass of small bodies heaped up together (*Boyle*).

To CONGE'ST. *v. a.* (*congestum*, Lat.) To heap up; to gather together.

CONGE'STIBLE. *a.* (from *congest.*) That may be heaped up.

CONGE'STION. *s.* (*congestio*, Lat.) A collection of matter, as in abscesses (*Quincy*).

CO'NGIARY. *s.* (*congiarium*, Latin.) A gift distributed to the Roman people or soldiery.

CONGIUS, an ancient Roman liquid measure, containing six sextarii, or about seven of our wine-measure pints. Half this was called congitella.

To CONGLA'CIATE. *v. n.* (*conglaciatus*, Latin.) To turn to ice (*Brown*).

CONGLACIA'TION. *s.* (from *conglaciate.*) Act of changing into ice (*Brown*).

CONGLETON, a town of Cheshire, having a market on Saturdays, and 3862 inhabitants. Lat. 53. 8 N. Lon. 2. 10 W.

To CO'NGLOBATE. *v. a.* (*conglobatus*, Lat.) To gather into a hard firm ball (*Grew*).

CONGLOBATE GLAND. (*glandula conglobata*; *conglobata* from *conglobo*, to gather into a ball). Lymphatic gland. Globate gland. A round gland formed of a contortion of lymphatic vessels, connected together by cellular structure, having neither a cavity nor an excretory duct: such are the mesenteric, inguinal, axillary glands, &c. See GLANDS.

CO'NGLOBATELY. *ad.* In a spherical form.

CONGLOBA'TION. *s.* (from *conglobate.*) A round body; acquired sphericity (*Brown*).

To CONGLO'BE. *v. a.* (*conglobo*, Latin.) To gather into a round mass (*Pope*).

To CONGLO'BE. *v. n.* To coalesce into a round mass (*Milton*).

To CONGLO'MERATE. *v. a.* (*conglomero*, Latin.) To gather into a ball, like a ball of thread (*Grew*).

CONGLO'MERATE. *a.* (from the verb.) 1. Gathered into a round ball, so as that the fibres are distinct (*Cheyne*). 2. Collected; twisted together (*Bacon*).

CONGLOMERATE GLAND. (*glandula conglomerata*; *conglomerata* from *conglomero*, to heap upon one). A gland composed of a number of glomerate glands, whose excretory ducts all unite into one common duct; such are the salival, parotid glands, &c.

CONGLOMERATE FLOWERS, or PEDUNCLES. In botany. When a branching peduncle bears flowers on very short pedicles, closely heaped and compacted together, without order; as in dactylis glomerata. Opposed to diffused. See GLOMERATE.

CONGLOMERA'TION. *s.* 1. Collection of matter into a loose ball. 2. Intertexture; mixture (*Bacon*).

To CONGLU'TINATE. *v. a.* (*conglutino*, Latin.) To cement; to reunite.

To CONGLU'TINATE. *v. n.* To coalesce; to unite by the intervention of a callus.

CONGLUTINA'TION. *s.* (from *conglutinate.*) The act of uniting wounded bodies; reunion; healing (*Arbuthnot*).

CONGLU'TINATIVE. *a.* (from *conglutinate.*) Having the power of uniting wounds.

CONGLUTINA'TOR. *s.* (from *conglutinate.*) That which has the power of uniting wounds (*Woodward*).

CONGO, a kingdom of Africa, bounded on the N. by Loango, on the S. by Angola, on the E. by Tungono and Metamba, and on the W. by the Ethiopic sea. The Portuguese have many settlements on this coast, which were begun soon after its discovery, in 1484. The natives are Pagans, worshipping the sun, moon, and stars, besides various kinds of animals. The trade of this country is chiefly in slaves, ivory, cassia, and tamarinds. It extends from the equinoctial line to 18 deg. of S. lat.

CONGO TEA, in commerce. See THEA.

CONGRA'TULANT. *a.* (from *congratulate.*) Rejoicing in participation (*Milton*).

To CONGRA'TULATE. *v. a.* (*gratulor*, Latin.) To compliment upon any happy event (*Sprat*).

To CONGRA'TULATE. *v. n.* To rejoice in participation (*Swift*).

CONGRATULA'TION. *s.* 1. The act of professing joy for the happiness or success of another. 2. The form in which joy for the happiness of another is professed.

CONGRA'TULATORY. *a.* (from *congratulate.*) Expressing joy for the good of another.

To CONGRE'E. *v. n.* To agree; to join (*Shakspeare*).

To CONGRE'ET. *v. n.* To salute reciprocally.

To CO'NGREGATE. *v. a.* (*congrego*, Lat.) To collect together; to assemble; to bring into one place (*Newton*).

To CO'NGREGATE. *v. n.* To assemble; to meet; to gather together (*Denham*).

CO'NGREGATE. *a.* (from the verb.) Collected; compact (*Bacon*).

CONGREGA'TION. *s.* (from *congregate.*) 1. The act of collecting (*Bacon*). 2. A collection; a mass brought together (*Shakspeare*). 3. An assembly met to worship God in publick, and hear doctrine (*Swift*).

CONGREGATION, signifies also an assembly of several ecclesiastics united, so as to constitute one body; as an assembly of cardinals, in the constitution of the pope's court, met for the dispatch of some particular business. These assemblies, being sixteen in number, are distributed into several chambers, after the manner of our offices and courts: the first whereof is the pope's congregation, whose business it is to prepare the most difficult beneficiary matters to be afterwards debated in the consistory: the second is the congregation of the holy office, or the inquisition: the third is the congregation de propaganda fide: the fourth is the congregation for explaining the council of Trent: the fifth is the congregation of the index, deputed to examine into pernicious and heretical books: the sixth is the congregation of immunities, established to obviate the difficulties that arise in the judgments of such suits as are carried on against churchmen: the seventh is the congregation of bishops and regulars: the eighth is the congregation for the examination of bishops, &c.

CONGREGA'TIONAL. *a.* (from *congregation.*) Publick; pertaining to a congregation.

CONGREGATIONALISTS. See INDEPENDENTS.

CO'NGRESS. *s.* (*congressus*, Latin.) 1. A meeting; a shock; a conflict (*Dryden*). 2. An appointed meeting for settlement of affairs between different nations.

CONGRESS, CONGRESSUS, is used for an assembly of commissioners, deputies, envoys, &c. from several courts or provinces, meeting to concert matters for their common good.

The congress at the Hague, which held during the course of the war terminated in 1697, by the treaty of Ryswick, was composed of the envoys of all the princes in the confederacy against France.

CONGRESS, in America, denotes that body in which, by the constitution of the United States, all legislative powers are vested. It consists of a senate and house of representatives, both chosen from among the people.

CONGRE'SSIVE. *a.* (from *congress.*) Meeting; encountering (*Brown*).

CONGREVE (William), an English dramatic poet, born in Staffordshire in 1672, but brought up in Ireland, first at Kilkenny school, and then at Trinity college, Dublin; after which he went to the Middle Temple; but it does not appear that he was ever called to the bar. His first literary production was a romance, called, Incognita, or Love and Duty reconciled, written at the age of 17. In 1693, appeared his comedy of the Old Bachelor, which was received with applause, and recommended the author to the earl of Halifax, who made him a commissioner in the Hackney-coach-office, to which he afterwards added some other places. His next performance was the Double Dealer; and in 1695 he brought out his Love for Love. He was next engaged in a controversy with Jeremy Collier respecting the immorality of his pieces. Here, however, the poet had much the worst of the argument, as the immoral tendency of some of his scenes is incontrovertible. From this quarrel Congreve took some distaste to the stage; yet he afterwards brought on the comedy of the Way of the World, which not succeeding completed his disgust to the theatre. He died in 1729, and left a large fortune behind him. His remains were interred in Westminster Abbey. Besides the pieces abovementioned, he wrote the Mourning Bride, a tragedy, and some poems.

To CO'NGRUE. *v. n.* (from *congruo*, Latin.) To agree; to be consistent with; to suit (*Shakspeare*).

CO'NGRUENCE. *s.* (*congruentia*, Latin.) Agreement; consistency.

CO'NGRUENT. *a.* (*congruens*, Latin.) Agreeing; correspondent (*Cheyne*).

CONGRU'ITY. *s.* (from *congrue.*) 1. Suitableness; agreeableness (*Glanville*). 2. Fitness; pertinence (*Sidney*). 3. Consequence of argument; reason; consistency (*Hooker*).

CO'NGRUMENT. *s.* (from *congrue.*) Fitness; adaptation: not in use (*Ben Jonson*).

CO'NGRUOUS. *a.* (*congruus*, Latin.) 1. Agreeable to; consistent with (*Locke*). 2. Suitable to; accommodated to (*Cheyne*). 3. Rational; fit (*Atterbury*).

CO'NGRUOUSLY. *ad.* (from *congruous.*) Suitably; pertinently; consistently (*Boyle*).

CO'NICAL. CO'NICK. *a.* (*conicus*, Latin.) Having the form of a cone (*Prior*).

CONIC, or CONICAL RECEPTACLE. In botany. In shape of a cone, round and broad at the base, but drawing to a point at the top. As in bellis (the common daisy), anthemis, &c.

CONIC SECTIONS, as the name imports, are such curve lines as are produced by the mutual intersection of a plane and the surface of a

solid cone. From the different positions of the plane there arise five different figures or sections, viz. a *triangle*, a *circle*, an *ellipse*, a *parabola*, and an *hyperbola*. The last three of these are peculiarly called *conic sections*, and the investigation of their nature and properties is generally denoted by the term *conics*.

1. If the cutting plane pass through the vertex of the cone, and any part of the base, the section will evidently be a triangle.

2. If the plane cut the cone parallel to the circular base, the section will be a circle, the cone being a right cone.

3. The section is a parabola when the cone is cut by a plane parallel to the side; or, when the cutting plane and the side of the cone make equal angles with the base.

4. The section is an ellipse, when the cone is cut obliquely through both sides, or when the plane is inclined to the base in a less angle than the side of the cone is.

5. The section is an hyperbola when the cutting plane makes a greater angle with the base than the side of the cone makes. And, if the plane be continued to cut the opposite cone, this latter section is called the opposite hyperbola to the former.

6. The vertices of any section are the points where the cutting plane meets the opposite sides of the cone. Hence, the ellipse and the opposite hyperbolas have each two vertices; but the parabola only one; unless we consider the other as at an infinite distance.

A plane however posited so that it does not pass through the vertex of the cone itself, we call a secant plane; and another plane which does pass through the vertex, and is every where parallel to the secant plane, may be called the vertical plane. If, now, the secant and the vertical plane be so moved round, in a parallelism each to the other, that the vertical plane doth sometimes cut the base, sometimes touch the conic superficies, and sometimes is placed wholly without the cone; it is manifest, that by these conical superficies, divers species of hyperbolas, divers parabolas, and divers species of ellipses, will be delineated in the secant plane. And moreover, the near affinity there is between all these lines may be plainly seen. For if the section be parallel to the base, or even in a scalene cone, if it be subcontrarily posited, it will be a circle; this is one of the extremes of the ellipse. From this, proceeding by a gradual change of the inclination of the secant plane, there will be produced infinite species of ellipses; until, at length, the inclination becoming parallel to the side of the cone, the other extreme of the ellipse goes off, and the figure passes into a parabola. And then, the inclination of the cutting plane being never so little changed farther, there will arise an hyperbola; of which there are infinite species, according to the different inclinations of the vertical plane within the cone. So that the ellipses do on one side end in a circle, on the other, in a parabola: the parabola, on one side, in an ellipse, on the other, in an hyperbola: the hyperbola, on one part, in a parabola, and on the other, in a straight line.

Here, therefore, we may note, 1. That the conic sections are in themselves a system of regular curves allied to each other; and that one is changed into another perpetually, when it is either increased or diminished, *in infinitum*. Thus, the curvature of a circle being ever so little increased or diminished, passes into an ellipse; and again, the centre of the ellipse going off infinitely, and the curvature being thereby diminished, is changed into a parabola; and lastly, the curvature of a parabola being ever so little changed, there ariseth the first of the hyperbolas; the innumerable species of which will all of them arise orderly by a gradual diminution of the curvature; till this quite vanishing, the last hyperbola ends in a right line. From whence it is manifest, that every regular curvature, like that of a circle, from the circle itself to a right line, is a conical curvature, and is distinguished with its peculiar name, according to the divers degrees of that curvature. 2. That all diameters in a circle and ellipse intersect one another in the centre of the figure within the section: that in the parabola they are all parallel among themselves, and to the axis: but in the hyperbola, they intersect one another, without the figure, in the common centre of the opposite and conjugate sections. 3. In the circle, the *latus rectum*, or parameter, is double the distance from the vertex to the focus, which is also the centre. But in ellipses, the parameters are in all proportions to that distance, between the double and quadruple, according to their different species. While, in the parabola, the parameter is just quadruple that distance. And, lastly in hyperbolas, the parameters are in all proportions beyond the quadruple, according to their various kinds.

We may also add farther, that a parabola is every-where equidistant from the circumference of a circle and a right line passing through its centre, or from a point and a right line given in position. An ellipse is every-where equidistant from the circumferences of two unequal tangent circles, which touch one the other within; or from the circumference of a circle and a point within it. An hyperbola is every-where equidistant from the circumferences of two unequal tangent circles, which touch one the other without; or from the circumference of a circle and a point without it.

The more ancient mathematicians, before the time of Apollonius Pergæus, admitted only the right cone into their geometry, and they supposed the section of it to be made by a plane perpendicular to one of its sides; and as the vertical angle of a right cone may be either right, acute, or obtuse, the same method of cutting these several cones, viz. by a plane perpendicular to one side, produced all the three conic sections. The parabola was called the section of a right-angled cone; the ellipse, the section of the acute-angled cone; and the hyperbola, the section of the obtuse-angled cone. But Apollonius, who, on account of his writings on this subject, obtained the appellation of *Magnus Geometra*, the Great Geometrician, observed, that these three sections might be obtained in every cone, both oblique and right, and that they depended on the different inclinations of the plane of the section to the cone itself. Apollon. Con. Halley's edit. lib. i, p. 9.

The doctrine of the conic sections is of great use in physical and geometrical astronomy, as well as in the physico-mathematical sciences: it has been much cultivated by both ancient and modern geometricians, who have left many good treatises on the subject. The most ancient of these is that of Apollonius Pergæus, containing eight books, the first four of which have often been published; but Dr. Halley's edition has all

the eight. Pappus, in his Collect. Mathem. lib. vii. says, that the first four of these were written by Euclid, though perfected by Apollonius, who added the other four to them. Among the moderns, the chief are Mydorgius de Sectionibus Conicis; Gregory St. Vincent's Quadratura Circuli et Sectionum Coni; De la Hire de Sectionibus Conicis; Trevigar Elem. Section. Con.; De Witt's Elementa Curvarum; Dr. Wallis's Conic Sections; De l'Hospital's Anal. Treat. of Conic Sections; Dr. Simpson's Section. Con.; Milne's Elementa Section. Conicarum; Muller's Conic Sections; Jack's Conic Sections; Emerson's Conic Sections; Steel's Conic Sections; Dr. Hamilton's elegant treatise; Dr. Hutton's, Mr. T. Newton's, Mr. Vince's, Mr. Walker's, and Dr. Abram Robertson's.

There are three methods of investigating and demonstrating the various properties of the conic sections. The first is to consider them as they are really cut from the cone itself, which is the way adopted by all the ancients; and is pursued very elegantly by Dr. Hamilton, Dr. Hutton, and others among the moderns. In the second method the properties are deduced from arbitrary descriptions of the curves in plano; the properties belonging to these curves being shewn to apply to those actually cut from the cone: this method has lead to able treatises from Boscovich, Dr. Simpson, and Dr. Robertson. In the third method the chief properties are inferred from the different modifications of the general algebraic equation of lines of the second order, and the established analogies between the properties of equations and those of curves. This method has been admirably elucidated by Euler, Prony, and Lacroix. Each of these modes of procedure has its advantages: but on the whole we are inclined to prefer the latter; and, therefore, as we are not acquainted with any work in the English language in which the properties of the conic sections have been investigated in this manner, we shall present the reader with the following.

1. Let us consider, then, this general equation:

$$0=\alpha+\beta x+\gamma y+\delta x^2+\varepsilon xy+\zeta yy,$$

which comprehends all the lines of the second order, whatever be the inclination under which the applicates meet the axis (See the article CURVES.). Let us give to the equation this form

$$yy+\frac{(\varepsilon x+\gamma)y}{\zeta}+\frac{\delta xx+\beta x+\alpha}{\zeta}=0;$$

then it is obvious, that for every abscissa x we shall either have two applicates y, or there will be none, according as the two roots of y are real or imaginary. If $\zeta=0$, there will then be only one applicate which will answer to each abscissa; the other will become infinite: thus, this case enters not into the investigation about which we are now to be occupied.

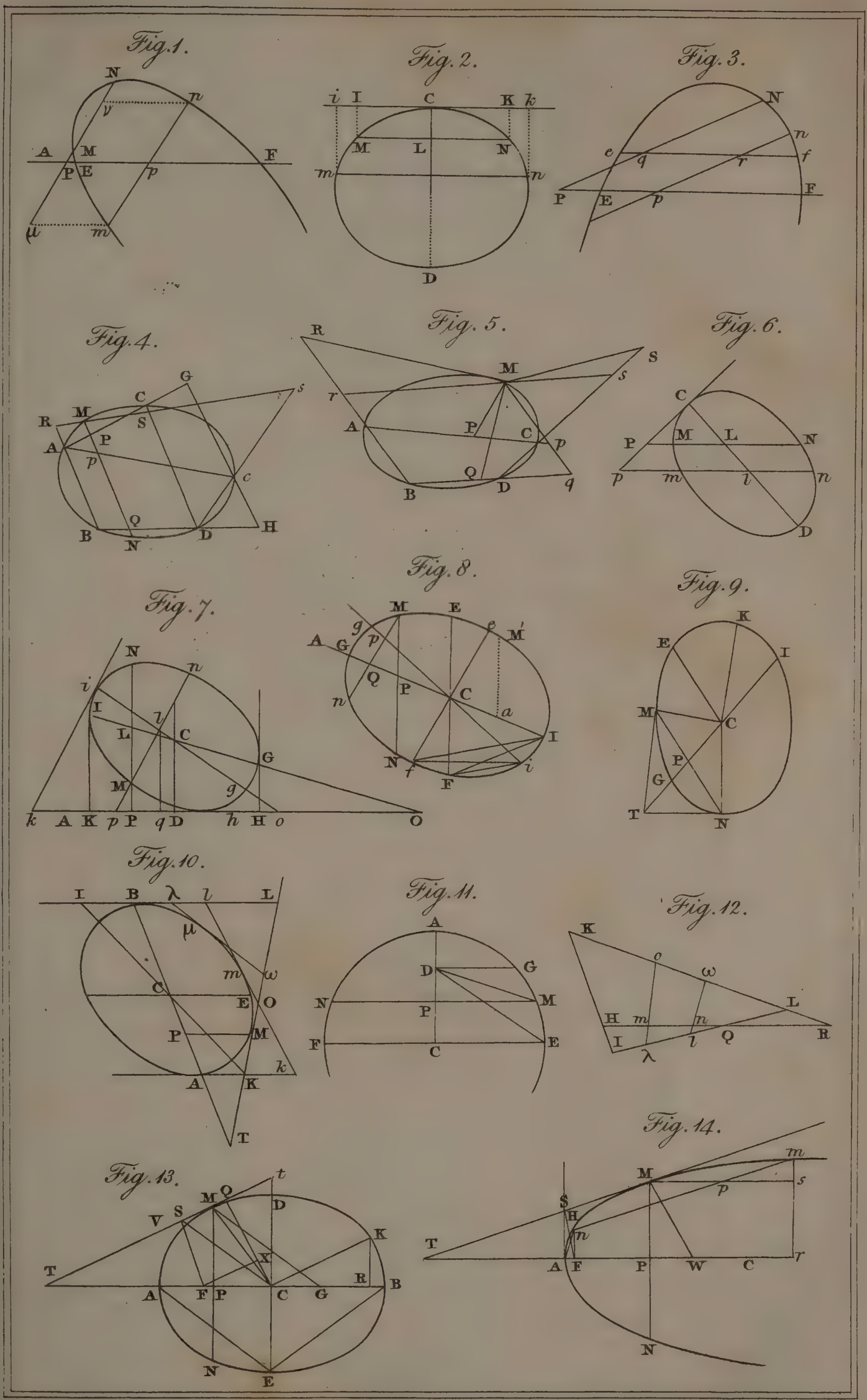
2. So long as the two values of y are real, which obtains when the applicate PMN intersects the curve in two points M and N (Pl. 47, fig. 1.), we shall have the sum of the roots $\mathrm{PM}+\mathrm{PN}=\frac{-\varepsilon x-\gamma}{\zeta}=\frac{-\varepsilon\,.\,\mathrm{AB}-\gamma}{\zeta}$; by taking the right line AEF for the axis of the abscissas, A for their origin, and the arbitrary angle APN to denote the inclination of the applicates with respect to the axis. If we draw any other applicate whatever, as npm, making an equal angle, in which the value of pm is negative, we shall have from the same $pn-pm=\frac{-\varepsilon\,.\,\mathrm{A}p-\gamma}{\zeta}$. By subtracting this equation from the former, the result will be $\mathrm{PM}+pm+\mathrm{PN}-pn=\frac{\varepsilon\,(\mathrm{A}p-\mathrm{AP})}{\zeta}=\frac{\varepsilon\,.\,\mathrm{P}p}{\zeta}$. If through the points m and n two right lines be drawn parallel to the axis, and meeting the former applicate in the points μ and ν, we shall have $\mathrm{M}\mu+\mathrm{N}\nu=\frac{\varepsilon\,.\,\mathrm{P}p}{\zeta}$, or the sum of $\mathrm{M}\mu+\mathrm{N}\nu$ in the constant ratio of ε to ζ with $\mathrm{P}p$, $m\mu$, or $n\nu$. Therefore this ratio will always be the same through whatever points of the curve the right lines MN and mn may be drawn, provided that they make a constant angle with the axis, and the right lines $n\nu$ and $m\mu$ be parallel to it.

3. If the applicate PMN be supposed to move until the two points M and N coincide, then it will touch the curve; for when the two points of intersection coincide the secant becomes a tangent. Then let KCI (Pl. 47, fig. 2.) be such a tangent, parallel to which as many right lines MN, mn, as we please may be drawn, to cut the curve in two parts. These are generally called right Chords and *Ordinates*. From the points M, N, m, n, let the right lines MI, NK, and mi, nk, be drawn to the tangent, and parallel to the axis first chosen. Then, as the intervals CK, Ck, fall at present on the opposite side of the point C, they ought to be regarded as negative. We shall therefore have $\mathrm{CI}-\mathrm{CK}:\mathrm{MI}::\varepsilon:\zeta$; and $\mathrm{C}i-\mathrm{C}k:mi::\varepsilon:\zeta$; therefore, $\mathrm{CI}-\mathrm{CK}:\mathrm{MI}::\mathrm{C}i-\mathrm{C}k:mi$, or $\mathrm{MI}:mi::\mathrm{CI}-\mathrm{CK}:\mathrm{C}i-\mathrm{C}k$.

4. The position of the axis with respect to the curve being arbitrary, the right lines MI, NK, mi, nk, may be drawn at pleasure, provided that they be parallel to each other; and we shall always have $\mathrm{MI}:mi::\mathrm{CI}-\mathrm{CK}:\mathrm{C}i-\mathrm{C}k$. Therefore, if the parallels MI and NK be so drawn, that CI=CK, and this will always be the case when the lines MI, and NK are parallel to CL, which commencing at the point of contact C, divides the ordinate MN into two equal parts in the point L: then, because $\mathrm{CI}-\mathrm{CK}=0$, we shall also have $\mathrm{C}i-\mathrm{C}k=\frac{mi}{\mathrm{MI}}(\mathrm{CI}-\mathrm{CK})=0$. If the line CL be prolonged to l, then since the lines mi and nk are parallel to CL, $ml=\mathrm{C}i$ and $nl=\mathrm{C}k$, and likewise $ml=nl$. From which it follows, that a right line CLl, which, drawn from the point of contact C, divides an ordinate MN parallel to the tangent into two equal parts, also bisects all the ordinates mn parallel to the same tangent in a similar manner.

5. Because the right line CLl divides all the ordinates that are drawn parallel to the tangent ICK into two equal parts, it is generally called the *diameter* of the line of the second order, or of the conic section. We may therefore draw within each line of the second order an infinite number of diameters, since there is no point of the curve to which we cannot suppose a tangent to be drawn. In effect, whatever may be the point of contact of the given tangent ICK, it is only necessary to draw an ordinate MN parallel to the tangent, and to bisect it in L, then the right line CL will be a diameter of the line of the second order, which will bisect all the ordinates parallel to the tangent IK.

6. It also follows from what precedes, that if a right line Ll bisect any two parallel ordinates



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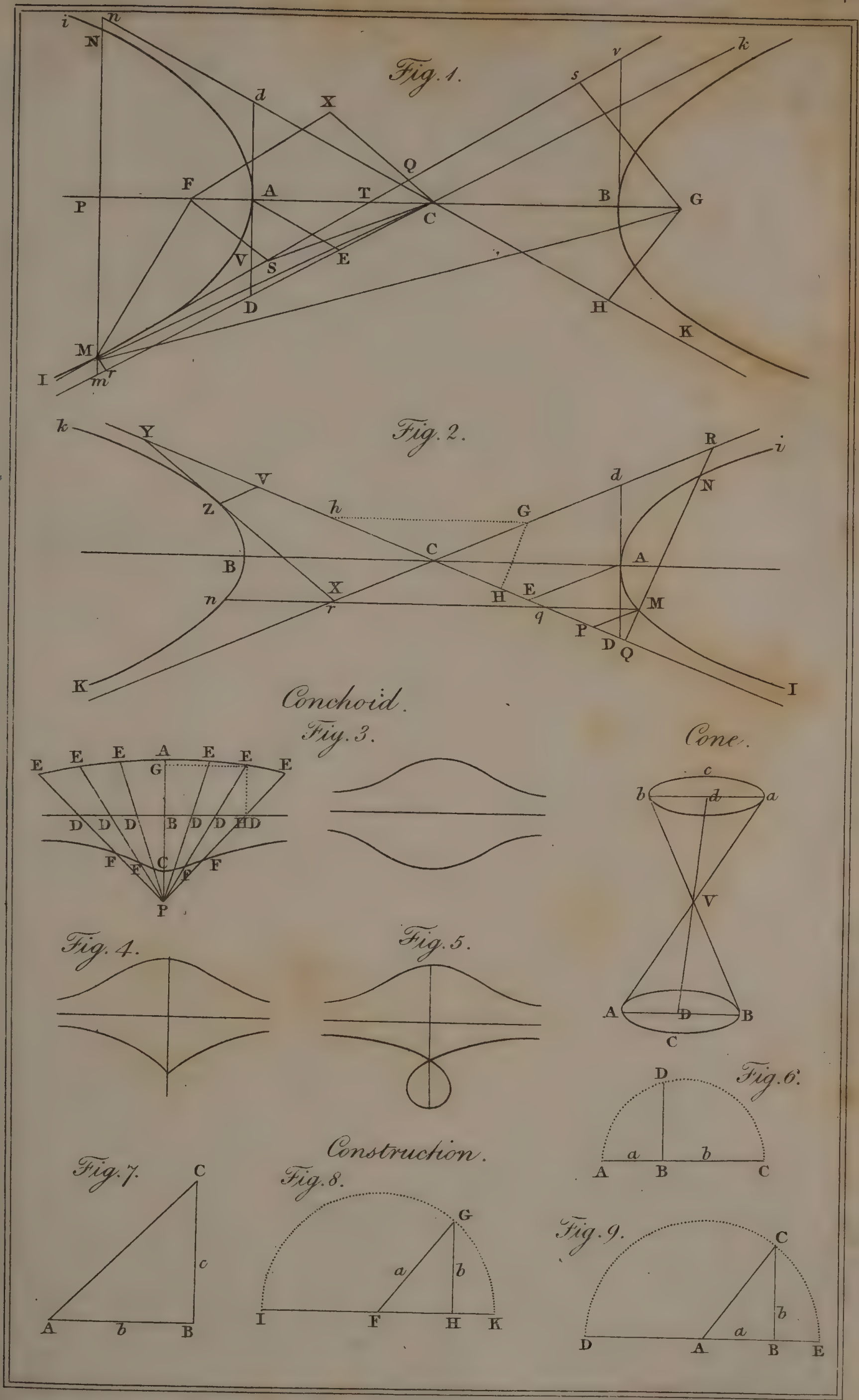

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whatever MN and mn, it will bisect in the same manner all other ordinates that are parallel to these; for the curve may have a tangent parallel to these ordinates, and consequently the right line by which they are bisected will be a diameter. An indefinite number of diameters may therefore be found to any conic section or line of the second order, by drawing any two ordinates or chords MN, and mn, at pleasure parallel to each other, and bisecting them in the points L and l; the right line which passes through these points will also bisect all other ordinates which are parallel to these, and by that means will be a diameter; and if through the point C, where the diameter produced meets the curve, the right line IK be drawn parallel to the ordinates, it will touch the curve in the point C.

7. We have been led to this property by the simple consideration of the sum of the roots of y in the equation:

$$yy+\frac{\varepsilon x+\gamma}{\zeta}y+\frac{\delta xx+6x+\alpha}{\zeta}=0.$$

But it is evident, from this equation, that the product of the two roots (fig. 1.) PM . PN $=\frac{\delta xx+6x+\alpha}{\zeta}$. This expression $\frac{\delta xx+6x+\alpha}{\zeta}$ has either two real simple factors, or it has none. The first case obtains when the axis intersects the curve in two points E and F; for, as at these two points $y=0$, we shall have also $\frac{\delta x^2+6x+\alpha}{\zeta}=0$; the roots of x will be AE and AF, and the factors $(x-AE)(x-AF)$; so that $\frac{\delta x^2+6x+\alpha}{\zeta}=\frac{\delta}{\zeta}(x-AE)(x-AF)=\frac{\delta}{\zeta}$. PE . PF, because $x=AP$.

We shall then have PM . PN $=\frac{\delta}{\zeta}$. PE . PF, or the rectangle PM . PN will be to the rectangle PE . PF in the constant ratio of δ to ζ, wherever the applicate PMN be drawn, provided that the angle NPF be equal to that which expresses the inclination of the applicates to the axis. If therefore we suppose an ordinate mn, such that the quantities Ep and pm become negative, we shall have in a similar manner $pm \cdot pn=\frac{\delta}{\zeta} \cdot p\text{E} \cdot p\text{F}$.

8. Having then drawn any right line whatever PEF (Pl. 47, fig. 3.) which intersects a line of the second order in two points E and F; if we draw to that line any ordinates NMP, npm, parallel to each other, we shall always have PM . PN : PE . PF : : $pm \cdot pn : p\text{E} \cdot p\text{F}$; for the two ratios of this proportion are each equal $\delta : \zeta$. In like manner as the position of the axis is arbitrary, by taking the right line PMN for the axis, and drawing parallel to PEF any other right line eqf, we shall have PM . PN : PE . PF : : $q\text{M} \cdot q\text{N} : qe \cdot qf : : pm \cdot pn : p\text{E} \cdot p\text{F}$, and alternately as $qe \cdot qf : p\text{E} \cdot p\text{F} : : q\text{M} \cdot p\text{N} : pm \cdot pn$. Having therefore given any two parallel ordinates ef and EF, if we suppose any two others to be drawn as MN, and mn, also parallel to each other, and cutting the former in the points P, p, q, r, we shall have this series of equal ratios, PM . PN : PE . PF : : $pm \cdot pn : p\text{E} \cdot p\text{F} : : q\text{M} \cdot q\text{N} : qe \cdot qf : : rm \cdot rn : re \cdot rf$. This is a second general property of lines of the second order.

9. When the two points M and N of the curve coincide, the right line PMN becomes a tangent at the point of concourse of the two points, and the rectangle PM . PN becomes the square of PM or PN; which gives a new property of tangents. Let us suppose the right line CPp (Pl. 47, fig 6.) which touches a line of the second order in the point C, and let us draw any other lines PMN, pmn, parallel to each other, and which therefore make the same angle with the tangent, we have by the property already found:

$$\text{PC}^2 : \text{PM} \cdot \text{PN} : : p\text{C}^2 : pm \cdot pn;$$

that is, wherever the ordinate be which is drawn to the tangent under a given angle, the ratio of the square of the right line CP to the rectangle PM . PN will be constant.

10. It follows from this at the same time, that if in a line of the second order any diameter CD (Pl. 47, fig. 2.) be drawn, bisecting all the chords MN, mn, and meeting the curve in two points C and D, we shall have

$$\text{CL} \cdot \text{LD} : \text{LM} \cdot \text{LN} : : \text{C}l \cdot l\text{D} : lm \cdot ln.$$

But, as LM=LN and $lm=ln$, we shall have $\text{LM}^2 : lm^2 : : \text{CL} \cdot \text{LD} : \text{C}l \cdot l\text{D}$, or the square of the semi-ordinate LM will be always to the rectangle CL . LD in a constant ratio. Thus, by taking the diameter CD for the axis, and these semiordinates LM for applicates, we may find the equation for lines of the second order; for, let the diameter CD$=a$, the abscissa CL$=x$, and the applicate LM$=y$, LD will be equal $a-x$, and we shall have yy to $ax-xx$ in a constant ratio, which we shall suppose that of h to k; then we have for lines of the second order the equation $yy=\frac{h}{k}(ax-x^2)$.

11. The two properties of lines of the second order which we have already found will conduct us to the discovery of several others. Let us suppose in a line of the same order two ordinates AB and CD (Pl. 47, fig. 4.) parallel to each other, and complete the quadrilateral ACDB; if through any point M of the curve we draw an ordinate MN parallel to AB and CD, and which cuts the right lines AC and BD in the points P and Q, the parts PM and QN will be equal to each other. For the right line bisecting the two ordinates AB and CD, which are parallel to each other, will bisect the ordinate MN, in like manner; but, the right line which bisects the two sides AB and CD, will also bisect the part PQ. Therefore, since the lines MN and PQ are bisected in the same point, it necessarily follows that MP=NQ, and MQ=NP. We can therefore, having given besides the four points A, B, C, and D, in the curve, a fifth point M, find, by means of this last, a sixth N, by taking NQ=MP.

12. Since MQ . QN is to BQ . QD in a constant ratio, because QN=MP, MP . MQ will also be to BQ . QD in the same ratio; that is, if we take any other point in the curve, as c, and through this point suppose the right line GcH to be drawn parallel to the lines AB and CD, and to meet the sides AC and BD produced in the points G and H, we shall have, in like manner, the same constant ratio for the rectangle of cG . cH to BH . DH, and consequently, cG . cH : BH . DH : : MP . MQ : BQ . DQ. But if we draw through the point M, parallel to the base BD, a line RMS, meeting the parallel ordinates AB, CD, in R and S, because BQ=MR, and DQ=MS, the ratio of MP . MQ : MR . MS will also be constant. Therefore, if through any point M of the curve we draw two right lines, the one MPQ parallel to the sides AB, CD, and the other RMS parallel to the base BD, the intersections P, Q, R, and S will be disposed in such a manner that the ratio of MP . MQ to MP . MS will be constant.

13. If instead of the ordinate CD, which is supposed parallel to AB, we draw any other Dc from the point D, and join Ac: from the manner which the right lines MQ and RMS, drawn as before, through the point M, parallel to the sides AB and BD, intersect the sides of the quadrilateral ABDc in the points P, Q, R, and s, a similar property is obtained. In effect we have MP . MQ : BQ . DQ : : cG . cH : BH . DH, or MP . MQ : MR . MS : : cG . cH : BH . DH, because the right line RS is parallel and equal to BD; but the similar triangles APp, AGc, and DSs, cHD, give, viz. in the former two, the proportion Pp : AP : : Gc : AG, or, because AP : AG : : BQ : BH, this; Pp : BQ : : Gc : BH, and in the latter two triangles, the proportion DS (MQ) : Ss : : cH : DH; by multiplying them in order, we shall have MQ . Pp : MR . Ss : : cG . cH : BH . DH, because BQ=MR. This last proportion compared with that which has been found above, gives

MP . MQ : MR . MS : : Pp . MQ : MR . Ss,

whence, taking the sum of the antecedents, and that of the consequents, we have

MP . MQ : MR . MS : : Mp . MQ : MR . Ms;

so that, in whatever part of the curve we take the points c and M, the ratio of Mp . MQ to MR . Ms, will always be the same, provided that the right lines MQ and Rs, which pass through M, are parallel to the chords AB, and BD. It follows from the preceding proportion that MP : MS : : Mp : Ms; therefore, since by varying the point c we only change the points p and s, the ratio of Mp to Ms will be constant; whatever may be the position of the point c, provided that the point M remain fixed.

14. If we take four points, A, B, C, D (Pl. 47, fig. 5.) upon a line of the second order, and join them by right lines, so as to form the inscribed trapezium ABDC, we may deduce a much more general property of the conic sections from what precedes. It is this; if from any point M of the curve we draw to each of the sides of the trapezium, under given angles, the right lines MP, MQ, MR, and MS (fig. 5.), the rectangles of the two lines which are drawn to the opposite sides of the trapezium will always be to each other in the same ratio; that is, MP . MQ will be to MR . MS in a constant ratio, whatever may be the position of the point M in the curve, provided that the angles at P, Q, R and S, do not change. To prove this, draw through the point M two right lines Mq and rs, the former parallel to the side AB, and the latter to the side BD; and mark the points of intersection p, q, r, and s, with the sides of the trapezium; then, according to what we have seen, Mp . Mq will be to Mr . Ms in a constant ratio; but, as the angles are all given, the ratios MP : Mp; MQ : Mq; MR : Mr; and MS : Ms will also be given; whence it follows that MP . MQ will be to MR . MS also in a constant ratio.

15. As we have seen above that, if we produce the parallel ordinates MN, mn (Pl 47, fig 6.) until they meet the tangent CPp in P and p, we shall have PM . PN : CP² : : pm . pn : Cp^2; if we assume the points L and l such that PL may be a mean proportional between PM and PN, and the same with pl in respect to pm and pn, we shall have PL² : CP² : : pl^2 : Cp^2; and consequently, PL : CP : : pl : Cp; whence it follows, that all the points, L, l, are situated in the right line which passes through the point of contact C. If, therefore an applicate PMN be so divided in the point L, that PL²=PM . PN, the right line CLD, drawn through the points C and L, will likewise divide any other applicate pmn in l, so that pl^2 shall be a mean proportional between pm and pn; or else, if we divide two applicates, PN and pn, in the points L and l, so that PL²=PM . PN, and $pl^2=pm \cdot pn$, the right line which passes through L and l being produced, will pass through the point of contact C, and will divide every other applicate which is parallel to these in the same ratio.

16. After having unfolded these properties of lines of the second order, which flowed immediately from the primitive form of the equation, we shall proceed to the research of other properties which are not so evident. And to this end, let us again recur to the general equation for lines of the second order:

$$yy+\frac{(\varepsilon x+\gamma)}{\zeta}y+\frac{\delta x^2+\beta x+\alpha}{\zeta}=0;$$

as there answers to every abscissa AP=x (Pl. 47, fig. 7.) two applicates y, viz. PM and PN, we may determine the position of the diameter which bisects every ordinate MN. For let IG be the diameter which ought to intersect the ordinate MN in the middle point L, and which will therefore fall upon the diameter required. Make PL=z: since $z=\frac{1}{2}$PM$+\frac{1}{2}$PN, we shall have $z=\frac{-\varepsilon x-\gamma}{2\zeta}$, or $2\zeta z+\varepsilon x+\gamma=0$, which is the equation required to determine the position of the diameter IG.

17. From this the length of the diameter IG may be deduced, which indicates the two places in the curve where the two points M and N coincide, that is in which PM=PN. The equation gives PM + PN$=\frac{-\varepsilon x-\gamma}{\zeta}$ and PM . PN$=\frac{\delta x^2+\beta x+\gamma}{\zeta}$, and therefore (PM−PN)²=(PM+PN)²−4 PM . PN$=\frac{(\varepsilon\varepsilon-4\delta\zeta)x^2+2(\varepsilon\gamma-2\beta\zeta)x+(\gamma\gamma-4\alpha\zeta)}{\zeta\zeta}=0$, or $x^2-\frac{2(2\beta\zeta-\varepsilon\gamma)}{\varepsilon\varepsilon-4\delta\zeta}x+\frac{\gamma\gamma-4\alpha\zeta}{\varepsilon\varepsilon-4\delta\zeta}=0$; the roots of this equation are therefore AK and AH, so that AK + AH $=\frac{4\beta\zeta-2\varepsilon\gamma}{\varepsilon\varepsilon-4\delta\zeta}$ and AK . AH$=\frac{\gamma\gamma-4\alpha\zeta}{\varepsilon\varepsilon-4\delta\zeta}$. Whence it follows that (AH−AK)²=HK²$=\frac{4(2\beta\zeta-\varepsilon\gamma)^2-4(\varepsilon\varepsilon-4\delta\zeta)\cdot(\gamma\gamma-4\alpha\zeta)}{(\varepsilon\varepsilon-4\delta\zeta)^2}$. But IG²$=\frac{\varepsilon\varepsilon+4\zeta\zeta}{4\zeta\zeta}$KH², whenever the applicates are perpendicular to the axis.

18. Let us suppose that the applicates which we have considered here are perpendicular to the axis, and endeavour to obtain the equation which answers to oblique applicates. For this purpose, suppose from any point M of the curve an applicate Mp to be drawn to the axis, making with it the oblique angle MpH, whose sine is denoted by μ and cosine by ν. Let the new abscissa A$p=t$, the new applicate pM=u, and we shall have $\frac{y}{u}=\mu$, and $\frac{Pp}{u}=\nu$; whence $y=\mu u$ and $x=t+\nu u$. These values being substituted in the equation between x and y:

$$0=\alpha+\beta x+\gamma y+\delta xx+\varepsilon xy+\zeta yy \text{ give}$$

$$\begin{aligned}0=\alpha+\beta t+\nu\beta u&+\delta t^2+2\nu\delta tu+\nu\nu\delta u^2\\ +\mu\gamma u&\quad\ +\mu\varepsilon tu+\mu\nu\varepsilon u^2\\ &\quad\ +\mu\mu\zeta u^2\end{aligned}$$

or $u^2+\frac{(\mu\varepsilon+2\nu\delta)\,t+\mu\gamma+\nu\beta)\,u+\delta t^2+\beta t+\alpha}{\mu\mu\zeta+\mu\varepsilon+\nu\nu\delta}=0$.

19. Each applicate will have in this case also two values pM and pn; therefore we may determine, as before, the diameter ilg of the ordinates Mn. For, having bisected the ordinates Mn in l, the point l will be in the diameter. Let, therefore $pl=v$, we shall have $v=\frac{PM+pn}{2}=\frac{-(\mu\varepsilon+2\nu\delta)t-\mu\gamma-\nu\beta}{2\mu\mu\zeta+\mu\nu\varepsilon+\nu\nu\delta}$. Let fall from the point l upon the axis AH the perpendicular lq, and make $Aq=p$, $ql=q$; so will $\mu=\frac{q}{v}$, and $\nu=\frac{pq}{v}=\frac{p-t}{v}$, and, consequently, $v=\frac{q}{\mu}$, and $t=p-\nu v=p-\frac{\nu q}{\mu}$. By substituting these values in the equation between t and v, we shall have $\frac{q}{\mu}=\frac{-\mu\varepsilon p-2\nu\delta p+\nu\varepsilon q+2\nu\nu\delta q:\mu-\mu\gamma-\nu\beta}{2\mu\mu\zeta+2\mu\nu\varepsilon+2\nu\nu\delta}$, or

$$(2\mu\mu\zeta+\mu\nu\varepsilon)q+(\mu\mu\varepsilon+2\mu\nu\delta)p+\mu\mu\gamma+\mu\nu\beta=0,$$

or lastly,

$(2\mu\zeta+\nu\varepsilon)q+(\mu\varepsilon+2\nu\delta)p+\mu\gamma+\nu\beta=0$, an equation which determines the position of the diameter ig.

20. The former diameter IG, the position of which is determined by this equation $2\zeta z+\varepsilon x+\gamma=0$, being produced will meet the axis mo, and we shall have $AO=\frac{-\gamma}{\varepsilon}$ and therefore $PO=\frac{-\gamma}{\varepsilon}-x$. The tangent of the angle LOP will be $=\frac{z}{PO}=\frac{-\varepsilon z}{\varepsilon x+\gamma}=\frac{\varepsilon}{2\zeta}$, and the tangent of the angle MLG under which the diameter IG meets the ordinate MN will be $=\frac{2\zeta}{\varepsilon}$. The other diameter ig produced will meet the axis mo, and we shall have $Ao=\frac{-\mu\gamma-\nu\beta}{\mu\varepsilon+2\nu\delta}$, and the tangent of the angle Aol will be $=\frac{\mu\varepsilon+2\nu\delta}{2\mu\zeta+\nu\varepsilon}$. As the tangent of the angle $AOL=\frac{\varepsilon}{2\zeta}$, the two diameters intersect each other in a certain point C, and comprise between them an angle $OCo=Aol-AOL$, the tangent of which is, therefore, $=\frac{4\nu\delta\zeta-\nu\varepsilon\varepsilon}{4\mu\zeta\zeta+2\nu\delta\varepsilon+2\nu\varepsilon\zeta+\mu\varepsilon\varepsilon}$. But the angle under which the other diameter meets the ordinates is $Mlo=180°-lpo-Aol$, the tangent of which is $=\frac{2\mu\mu\zeta+2\mu\nu\varepsilon+2\nu\nu\delta}{\mu\mu\varepsilon+2\mu\nu\delta-2\mu\nu\zeta-\nu\nu\varepsilon}$.

21. Let us now determine the point C, where these two diameters mutually intersect each other. And in order to this, suppose a perpendicular CD let fall from this point upon the axis. Put $AD=g$, $CD=h$: first, if the point C be considered as appertaining to the diameter IG, we shall have $2\zeta h+\varepsilon g+\gamma=0$, and when it belongs to the diameter ig, we shall have

$$(2\mu\zeta+\nu\varepsilon)h+(\mu\varepsilon+2\nu\delta)g+\mu\gamma+\nu\beta=0.$$

Subtracting the latter equation from the former, after multiplying by μ, there will remain $\nu\varepsilon h+2\nu\delta g+\nu\beta=0$; or $\varepsilon h+2\delta g+\beta=0$; from which we obtain $h=\frac{-\varepsilon g-\gamma}{2\zeta}=\frac{-2\delta g-\beta}{\varepsilon}$, and, therefore, $(\varepsilon\varepsilon-4\delta\zeta)g=2\beta\zeta-\gamma\varepsilon$; $g=\frac{2\beta\zeta-\gamma\varepsilon}{\varepsilon\varepsilon-4\delta\zeta}$, and $h=\frac{2\gamma\delta-\beta\varepsilon}{\varepsilon\varepsilon-4\delta\zeta}$. As the quantities μ and ν, upon which the obliquity of the applicate pMn depends, do not enter into these expressions, it evidently follows that the point C remains the same whatever be the obliquity of the applicate.

22. Since all the diameters IG, ig mutually intersect in the point C; when that is once determined, we shall have a point through which all the diameters will pass; and reciprocally, all the right lines drawn through this point will be so many diameters, which will intersect all the ordinates under a certain angle; and as there is only one point in a line of the second order, where all the diameters intersect each other, it is termed the CENTRE of the conic section. We may find it by means of the proposed equation between x and y,

$$0=\alpha+\beta x+\gamma y+\delta x^2+\varepsilon xy+\zeta y^2;$$

by taking $AD=\frac{2\beta\zeta-\gamma\varepsilon}{\varepsilon\varepsilon-4\delta\zeta}$, and $CD=\frac{2\gamma\delta-\beta\varepsilon}{\varepsilon\varepsilon-4\delta\zeta}$.

23. We have found above that $AK+AH=\frac{4\beta\zeta-2\gamma\varepsilon}{\varepsilon\varepsilon-4\delta\zeta}$; but IK and GH are perpendiculars let fall from the extremities of the diameter IG upon the axis, which shows that $AD=\frac{AK+AH}{2}$; and therefore the point D will be equidistant from the points K and H. Thus we see why the centre C will be placed in the middle of the diameter IG; and as the same will equally obtain in every other diameter, it follows, not only that all diameters intersect each other in the point C, but also that they reciprocally bisect each other in the same point.

24. Let us now take any diameter AI (Pl. 47, fig. 8.) for the axis, to which the ordinates MN are applicates under an angle $APM=q$, whose sine $=m$ and cosine $=n$. Let the abscissa $=x$, and the applicate $PM=y$; as there are here two equal values, one positive and the other negative, and, therefore, their sum $=0$, the general equation for a line of the second order will take this form: $yy=\alpha+\beta x+\gamma xx$, which will give, by making $y=0$, the two points, G and I, where the curve crosses the axis. Therefore the roots of the equation $x^2+\frac{\beta}{\gamma}x+\frac{\alpha}{\gamma}=0$, will be $x=AG$, and $x=AI$; and consequently, we shall have $AG+AI=\frac{-\beta}{\gamma}$, and $AG\,.\,AI=\frac{\alpha}{\gamma}$. Hence as the centre C is situated in the middle of the diameter GI, we can easily find the centre of a conic section; for we shall have $AC=\frac{AG+AI}{2}=\frac{-\beta}{2\gamma}$.

25. The centre C of the conic section being now known, it may be taken for the origin of the abscissas. Therefore, let $CP=t$, and as $PM=y$ remains the same, and $x=AC-CP=\frac{-\beta}{2\gamma}-t$, the equation between the co-ordinates t and y will be:

$$y^2=\alpha-\frac{\beta\beta}{2\gamma}+\frac{\beta\beta}{4\gamma}-\beta t+\beta t+\gamma t^2,$$

$$\text{or } y^2=\alpha-\frac{\beta\beta}{4\gamma}+\gamma t^2.$$

Therefore, by uniting x for t, we shall obtain the general equation for lines of the second order, any diameter being taken for the axis, and the

abscissas being computed from the centre; and if we change the form of the constant quantities, it will become $yy=\alpha-6xx$. By making $y=0$, we shall have $CG=CI=\sqrt{\frac{\alpha}{6}}$; and therefore, the whole diameter GI will be $2\sqrt{\frac{\alpha}{6}}$.

26. If we make $x=0$, and find the ordinate EF which passes through the centre; we shall have $CE=CF=\sqrt{\alpha}$, and therefore every ordinate $EF=2\sqrt{\alpha}$; and as it passes through the centre, it will also be a diameter, and will make with the former diameter GI an angle $ECG=q$. But the diameter EF will bisect all the ordinates parallel to the diameter GI; for, having made the abscissa CP negative, the applicate aM' which will fall upon the side of I will be equal to the former PM; and as it is at the same time parallel to it, the two points M, M', joined together, will give a line parallel to the diameter GI, and which ought, therefore, to be bisected by the diameter EF. These two diameters GI and EF, are therefore so disposed with regard to each other, that the one bisects all the ordinates that are parallel to the other, and reciprocally; and from this property these two diameters are called CONJUGATES. If therefore we draw two right lines through the extremities G and I of the diameter GI, and parallel to the diameter EF, they will touch the curve; and in like manner, if through the points E and F we draw right lines parallel to the diameter GI, they will touch the curve in the points E and F.

27. Let us now draw any oblique applicate MQ, making the angle $AQM=\phi$, the sine of which $=\mu$, and its cosine $=\nu$; let the abscissa $CQ=t$, and the applicate $MQ=u$; as the angle $PMQ=\phi-q$, and therefore the sin. $PMQ=\mu n-\nu m$, we shall have in the triangle PMQ, $y:u::PQ::\mu:m::\mu n-\nu m$; whence $y=\frac{\mu u}{m}$, and $PQ=\frac{(\mu n-\nu m)u}{m}$, and consequently $x=t-PQ=t-\frac{(\mu n-\nu m)u}{m}$. Substituting these values in the given equation above $yy=\alpha-6xx$, or $yy+6xx-\alpha=0$; we shall have

$(\mu\mu+6(\mu n-\nu m)^2)uu-26m(\mu n-\nu m)tu+6m^2t^2\alpha m^2=0$, an equation which gives for the applicate u two values, QM and $-Qn$; and therefore $QM-QN=\frac{26m(\mu n-\nu m)t}{\mu\mu+6(\mu n-\nu m)^2}$. If we bisect the ordinate Mn in p, the right line Cpg will be a new diameter, which will bisect all the ordinates parallel to Mn, and we shall have $Qp=\frac{6m(\mu n-\nu m)t}{\mu\mu+6(\mu n-\nu m)^2}$.

28. Hence it appears that the tangent of the angle $GCg=\frac{\mu QP}{CQ+\nu.QP}$, or tang. $GCg=\frac{6m(\mu n-\nu m)}{\mu+n6(\mu n-\nu m)}$, and that tang. $Mpg=\frac{\mu.CQ}{PQ+\nu.CQ}=\frac{\mu\mu+6(\mu n-\nu m)^2}{\mu\nu+6(\mu n-\nu m)(\nu n+\mu m)}$; that is, the angle under which the new ordinates Mn are cut by the diameter gi. Farther, $Cp^2=CQ^2-Qp^2+2\nu.CQ.Qp=\frac{\mu^4+26\mu^3n(\mu n-\nu m)+66\mu^2(\mu n-\nu m)^2}{(\mu\mu+6(\mu n-\nu m)^2)^2}t^2$, and $Cp=\mu t\frac{\sqrt{(\mu^2+26\mu n(\mu n-\nu m)+66(\mu n-\nu m)^2)}}{\mu\mu+6(\mu n-\nu m)^2}$. If we make $Cp=r$, and $pM=s$, we shall have $t=\frac{(\mu\mu+6(\mu n-\nu m)^2)r}{\mu\sqrt{(\mu^2+26\mu n(\mu n-\nu m)+6^2(\mu n-\nu m)^2)}}$, and $u=s+Qp=s+\frac{6m(\mu n-\nu m)r}{\mu\sqrt{(\mu^2+26\mu n(\mu n-\nu m)+6^2(\mu n-\nu m)^2)}}$.

These values give:

$$y=\frac{\mu s}{m}+\frac{6(\mu n-\nu m)r}{\sqrt{(\ldots\ldots)}}, \text{ and}$$

$$x=\frac{(\mu n-\nu m)s}{m}+\frac{\mu r}{\sqrt{(\ldots\ldots)}};$$

whence we may conclude, by substituting in the equation $yy+6xx-\alpha=0$, $\frac{(\mu\mu+6(\mu n-\nu m)^2)ss}{mm}+\frac{6(\mu\mu+6(\mu n-\nu m)^2)rr}{\mu\mu+26mn(\mu n-\nu m)+6^2(\mu n-\nu m)^2}-\alpha=0$.

29. Let us now make the semi-diameter $CG=f$, and the semi-conjugate $CE=CF=g$; then $f=\sqrt{\frac{\alpha}{6}}$, and $g=\sqrt{\alpha}$, or $\alpha=g^2$, and $6=\frac{g^2}{f^2}$ whence results the equation $y^2+\frac{gg}{ff}x^2=g^2$. If the angle GCg be supposed $=p$, then tang. $p=\frac{6m(\mu n-\nu m)}{\mu+n6(\mu n-\nu m)}$. But because the angle $GCE=q$, if we make the angle $ECe=\pi$, we shall have $AQM=\phi=q+\pi$, and therefore $\mu=\sin.(q+\pi)$, $\nu=\cos.(q+\pi)$, $m=\sin.q$, and $n=\cos.q$. Then tan.

$$p=\frac{6.\sin.q.\sin.\pi}{\sin.(q+\pi)+6.\cos.q.\sin.\pi}=\frac{6.\tan.q.\tan.\pi}{\tan.q+\tan.\pi+6.\tan.\pi};$$

$$\sin.p=\frac{6\sin.q\sin.\pi}{\sqrt{(\mu^2+26\mu n(\mu n-\nu m)+66(\mu n-\nu m)^2)}};$$

and $\mu\mu+6(\mu n-\nu m)^2=(\sin.(q+\pi))^2+6(\sin.\pi)^2$. By the substitution of these values, we shall obtain for the equation between r and s,

$$\frac{((\sin.q+\pi)^2+6\sin.\pi)^2)s^2}{(\sin.q)^2}+\frac{6((\sin.q+\pi)^2+6.(\sin.\pi)^2r^2(\sin.p)^2}{66(\sin.q)^2(\sin.\pi)^2}-\alpha=0;$$

but, $6=\frac{\tan.p.\sin.(q+\pi)}{(\sin.q-\cos.q.\tan.p)\sin.\pi}=\frac{\tan.p(\tan.q+\tan.\pi)}{\tan.\pi(\tan.q-\tan.p)}=\frac{gg}{ff}=\frac{\cot.\pi.\tan.q+1}{\cot.p.\tan.q-1}$, or tang. $q=\frac{ff+gg}{gg.\cot.p-ff.\cot.\pi}$, whence many corollaries might be deduced; besides, we shall have $\frac{gg}{ff}=\frac{\sin.p.\sin.(q+\pi)}{\sin.\pi.\sin.(q-p)}$.

30. If the semi-diameter $Cg=a$, and its semi-conjugate $Ce=b$, we may find from the given equation above, $a=$

$$\frac{\sin.q.\sin.\pi.\sqrt{\alpha 6}}{\sin.p.\sqrt{((\sin.q+\pi)^2+6(\sin.\pi)^2)}}=\frac{gg.\sin.q.\sin.\pi}{\sin.p.\sqrt{(ff(\sin.(q+\pi))^2+g^2(\sin.\pi)^2)}}, \text{ and}$$

$$b=\frac{fg\sin.q}{\sqrt{(ff(\sin.(q+\pi))^2+gg(\sin.\pi)^2)}};$$

we shall therefore, have $a:b::g.\sin.\pi:f.\sin p$. But $(\sin.(q+\pi))^2+\frac{gg}{ff}(\sin.\pi)^2=\frac{\sin.(q+\pi)}{\sin.(q-p)}\sin.(q-p)(\sin.(q+\pi)+\sin.p.\sin.\pi))=$

$$\frac{\sin. q . \sin. (q+\pi) \sin. (q+\pi-p)}{\sin. (q-p)};$$ therefore $a=$ $$\frac{gg \sin. \pi}{f \sin. p} \sqrt{\frac{\sin. q . \sin. (q-p)}{\sin (q+\pi) \sin. (q+\pi-p)}};$$ or, because $$\frac{gg}{ff}=\frac{\sin. p . \sin (q+\pi)}{\sin. \pi . \sin. (q-p)},$$ $$a=f\sqrt{\frac{\sin. q . \sin. (q+\pi)}{\sin. (q-p) . \sin. (q+\pi-p)}},$$ and $$b=g\sqrt{\frac{\sin. q . \sin. (q-p)}{\sin. (q-\pi) \sin. (q+\pi-p)}};$$ therefore $a : b :: f . \sin. (q+\pi) : g . \sin. (q-p)$, and $ab=\frac{fg . \sin. q}{\sin. (q+\pi-p)}$.

31. Hence, if in any conic section, we conceive the conjugate diameters GI, EF and gi, ef, to be drawn, we shall have first

$Cg : Ce :: CE . \sin. EGe : CB . \sin. GCg$.

Secondly,

$\sin. GCg : \sin. ECe :: CE . Ce : CB . Cg$;

and if we suppose the chords Ee and Cg, the triangle CGg will be equal to the triangle CEe; we shall then have $Cg : Ce :: Cv . \sin. GCE : CE . \sin. gCE$, or $Ce . CG . \sin. GCe = CE . Cg . \sin. gCE$; therefore, if we draw the chords Ge and gE, the triangles GCe and gCE will be equal to each other, or otherwise, by taking those that are opposite, the triangle ICf will be = to the triangle iCF. The last equation $ab . \sin. (q+\pi-p)=fg . \sin. q$, will give $Cg . Ce . \sin. gCe = CG . CE . \sin. GCE$. If, therefore, the chords EG and eg are drawn, or their opposites FI and fi, the triangles ICF and icf will likewise be equal; whence it follows that all parallelograms constructed about two conjugate diameters are equal to each other.

32. We have therefore three pairs of triangles equal to each other; viz.

I. The triangle FCf equal to the triangle ICi;
II. The triangle fCI equal to the triangle FCi;
III. The triangle FCI equal to the triangle fCi:

whence it follows that the trapezia FfCI and iICf will be equal to each other; if the triangle fCI be subtracted from each of them, the triangle FIf will be = to the triangle Ifi; and, as they have the same base fI, the chord Fi is necessarily parallel to the chord fI. Again, we shall have the triangle FIi = the triangle ifF; and if there be added to them the equal triangles ECI and fCi, the result will be two equal trapezia, FCIi = iCfF.

33. From this also a method of drawing a tangent MT (Pl. 47, fig. 9.) to any point M of a line of the second order may be obtained. For having taken for an axis a diameter GI, the semiconjugate of which is EC, from the point M to the axis, parallel to CI, draw the line MP, which will be a semi-ordinate, and which will give PN = PM; then, having drawn the semi-diameter CM, and obtained the semi-conjugate CK, the required tangent MT will be parallel to it. Put the angle GCE $=q$, GCM $=p$, and ECK $=\pi$, and we shall have, as has been found above, $$\frac{EC^2}{GC^2}=\frac{\sin. p . \sin. (q+\pi)}{\sin. \pi . \sin. (q-p)},$$ and $$MC=CG\sqrt{\frac{\sin. q . \sin. (q+\pi)}{\sin. (q-p) \sin. (q+\pi-p)}}.$$ But in the triangle CMP we have $MC^2=CP^2+MP^2+2PM . CP . \cos. q$; moreover, $MP : MC :: \sin. p : \sin. q$, and $MP : CP :: \sin. p : \sin. (q-p)$. Besides, in the triangle CMT, the angles of which are given, we have $CM : CT : MT : \sin. (q+\pi) : \sin. (q+\pi-p) : \sin. p$. Therefore, by exterminating the angles, we shall obtain $MC=CG\sqrt{\frac{MC . CM}{CP . CT}}$, or $CG^2=CP . CT$; hence $CP : CG :: CG : CT$; which gives a ready method of finding the position of the tangent. This proportion will also give, *dividendo*, $CP : PG :: CG : TG$, and, *componendo*, because CG = CI, $CP : IP :: CG : TI$.

34. Since we have $$\frac{CE^2}{CG^2}=\frac{\sin. p . \sin. (q+\pi)}{\sin. \pi . \sin. (q-p)};$$ $$\frac{CK^2}{CM^2}=\frac{\sin. p . \sin. (q-p)}{\sin. \pi . \sin. (q+\pi)};\quad \frac{CM^2}{CG^2}=\frac{\sin. q . \sin. (q+\pi)}{\sin. (q-p) (q+\pi-p)};$$ and $$\frac{CK^2}{CE^2}=\frac{\sin. q . \sin. (q-p)}{\sin. (q+\pi) \sin. (q+\pi-p)};$$ it follows that $$\frac{CE^2+CG^2}{CG^2}=\frac{\sin. p . \sin. (q+\pi)+\sin. \pi . \sin. (q-p)}{\sin. \pi . \sin. (q-p)},$$ and $$\frac{CK^2+CM^2}{CM^2}=\frac{\sin. p . \sin. (q-p)+\sin. \pi . \sin. (q+\pi)}{\sin. \pi . \sin. (q+\pi)}.$$ But $\sin. A . \sin. B = \frac{1}{2} \cos. (A-B) - \frac{1}{2} \cos. (A+B)$; and reciprocally $\frac{1}{2} \cos. A - \frac{1}{2} \cos. B = \sin. \frac{A+B}{2} \sin. \frac{B-A}{2}$. We shall therefore have $\sin. p . \sin. (q+\pi) + \sin. \pi . \sin. (q-p) = \frac{1}{2} \cos. (q+\pi-p) - \frac{1}{2} \cos. (q+\pi+p) + \frac{1}{2} \cos. (q-\pi-p) - \frac{1}{2} \cos. (q+\pi-p) = \frac{1}{2} \cos. (q-\pi-p) - \frac{1}{2} \cos. (q+\pi+p) = \sin. q . \sin. (q+\pi)$. In like manner, $\sin. p . \sin. (q-p) + \sin. \pi . \sin. (q+\pi) = \frac{1}{2} \cos. (q-2p) - \frac{1}{2} \cos. q + \frac{1}{2} \cos. q - \frac{1}{2} \cos. (q+2\pi) \frac{1}{2} = \cos. (q-2p) - \frac{1}{2} \cos. (q+2\pi) = \sin. (q+\pi-p) \sin. (p+\pi)$. We shall have therefore $$\frac{CE^2+CG^2}{CG^2}=\frac{\sin. q . \sin. (p+\pi)}{\sin. \pi . \sin. (q+\pi)},$$ and $$\frac{CK^2+CM^2}{CM^2}=\frac{\sin. (q+\pi-p) \sin. (p+\pi)}{\sin. \pi . \sin. (q+\pi)}=$$ from which we obtain, $$\frac{CE^2+CG^2}{CK^2+CM^2}=\frac{CG^2}{CM^2} . \frac{\sin. q . \sin. (q+\pi)}{\sin. (q-p) \sin. (q+\pi-p)}=\frac{CG^2}{CM^2} . \frac{CM^2}{CG^2}.$$ Therefore, $CE^2+CG^2=CK^2+CM^2$; and consequently the sum of the squares of two conjugate diameters is always constant in the same line of the second order.

35. The two semi-conjugate diameters CG and CE being given, if we take at pleasure a semi-diameter CM, we find at once its semi-conjugate CK, by taking $CK=\sqrt{CE^2+CG^2-CM^2}$. But by the properties of the conic sections, before found, $TG . TI : TM^2 :: CG . CI : CK^2 :: CG^2 ; CK^2 :: CG^2 : CE^2+CG^2-CM^2$; and therefore, $$TM=\frac{1}{CG}\sqrt{(TG . TI (CE^2+CG^2-CM^2))}.$$ If, from the extremities of MN, two tangents MT and NT be drawn, they will meet each other in the same point T of the axis TI; for we shall have for each this proportion, as $CP : CG :: CG : CT$. But if the right line CN be drawn, $TN=\frac{1}{CG}\sqrt{(TG . TI . (CE^2+CG^2-CN^2))}$, and therefore $TM^2 : TN^2 :: CE^2+CG^2-CM^2 : CK^2+CG^2-CN^2$; and as MN is besected in P, we shall have $\sin. CTM : \sin. CTN$

$:: \sqrt{(CE^2+CG^2-CN^2)} : \sqrt{(CE^2+CG^2-CM^2)}$.

36. If from the extremities of the diameter AB Pl. 47, fig. 10.) the tangents AK and BL be drawn, and any other tangent MT produced both ways to meet the two former in the points K and L; also if the conjugate diameter ECF be drawn, to which the applicate MP, and the tangents AK and BL are parallel. Then, by the nature of the tangent CP : CA :: CA : CT; because CB=CA, we shall have CP : AP :: CA : AT, and CP : BP :: CA : BT; therefore, CP : CA :: CA : CT :: AP : AT :: BP : BT; whence AT : BT :: AP : BP; but AT : BT :: AK : BL; therefore AK : BL :: AP : BP. We have then $AT=\frac{CA\,.\,AP}{CP}$, $BT=\frac{CA\,.\,BP}{CP}$, $PT=\frac{CA.AP}{CP}+AP=\frac{AP.BP}{CP}$; therefore AT : PT :: CA : BP :: AK : PM. In like manner, BT : PT :: CA : AP :: BL : PM; whence we obtain $AK=\frac{AC\,.\,PM}{BP}$, $BL=\frac{AC\,.\,PM}{AP}$ and $AK\,.\,BL=\frac{CA^2.\,PM^2}{AP\,.\,BP}$. But AP . BP : PM^2 :: AC^2 : CE; whence is obtained this elegant property, $AK\,.\,BL=CE^2$: from this it also follows, that $AK=CE\sqrt{\frac{AP}{BP}}$; and $BL=CE\sqrt{\frac{BP}{AP}}$; AP : BP :: AK^2 : CE^2 :: CE^2 : BL^2 :: KM : ML; and AK : BL :: KM : LM.

37. Hence, if a tangent be drawn to any point M of the curve, and meet two other parallel tangents AK, BL, in the points K and L, the semi-diameter CE, parallel to the tangents AK and BL, will always be a mean proportional between AK and BL, or $CE^2=AK\,.\,BL$. Therefore, if a tangent *kml* be drawn in a similar manner to any other point of the curve *m*, we shall also have $CE^2=Ak\,.\,Bl$; and consequently, AK : A*k* :: B*l* : B*l* : BL, and AK : K*k* :: B*l* : L*l*. If the tangents intersect each other in *o*, we shall have AK : B*l* :: A*k* : BL :: K*k* : L*l* :: *ko* : *lo* :: K*o* : L*o*. Such are the principal properties of the conic sections, by means of which Newton has resolved a great number of remarkable problems in his Principia.

38. Since we have AK : B*l* :: K*o* : L*o*, if the tangent LB be produced to I, so that BI=AK, the point I will be the place where the tangent drawn from the other side paralled to KL ought to meet the tangent LB, as the point K in the tangent LK is that where it is cut by the tangent AK, parallel to BL. The right line IK will therefore pass through the centre C, where it will be bisected. Hence, if any two tangents BL, ML, are produced, as above, to I and K, and are intersected by a third *lmo* in the points *l* and *o*, we shall have BI : B*l* :: K*o* : L*o*, and, *componendo*, IB : I*l* :: K*o* : KL; so that, whatever may be the point through which the third tangent *lmo* may pass, we shall always have IB . KL=I*l* . K*o*. Having then drawn a fourth tangent $\lambda\mu\omega$, which intersects the two former IL and KL, in λ and ω, we shall likewise have IB . KL=Iλ . Kω, and therefore I*l* . K*o*=Iλ . Kω, or I*l* : Iλ :: Kω : K*o*. Hence, if we suppose the two right lines *l*ω and λ*o*, divided in any given ratio, the right line which passes through the points of division will divide IK in the same ratio, consequently, if the right lines *l*ω and λ*o* are bisected, the right line which passes through the points of bisection will also bisect IK, and will therefore pass through the centre of the conic section.

39. We may also demonstrate by geometry, that if I*l* : Iλ :: Kω : K*o*, or Iλ : λ*l* :: K*o* : *o*ω, (Plate 47, fig. 12), the right line *nm*H, which divides the right lines *l*ω and λ*o* in a given ratio, must divide the line IK in the same ratio. Let us suppose that the line *mn* divides the other two lines *l*ω, and λ*o* in the ratio of *m* : *n*, or that λm : *mo* :: *ln* : *n*ω :: *m* : *n*; and that *mn* when produced meets the tangents IL, and KL in Q and R; we shall have sin. Q : sin. R :: $\frac{ln}{Ql}:\frac{n\omega}{R\omega}::\frac{\lambda m}{Q\lambda}:\frac{mo}{Ro}::\frac{m}{Ql}:\frac{n}{R\omega}$. Therefore Q*l* : R$\omega$ :: Qλ : R*o*, and *dividendo*, *l*λ : *o*ω :: Qλ : R*o* :: Q*l* : Rω; but, as we have *l*λ : *o*ω :: Iλ : K*o*, we shall also have QI : KR :: *l*λ : *o*ω, and sin. Q : sin. R :: $\frac{m}{l\lambda}:\frac{n}{o\omega}$. But, we also have sin. Q : sin. R :: $\frac{HI}{QI}:\frac{HK}{KR}::\frac{HI}{l\lambda}:\frac{HK}{o\omega}$; whence it follows that HI : HK :: *m* : *n*=λm : *mo* :: *ln* : *n*ω.

40. Therefore, having given two conjugate semidiameters CG, CE (Plate 47, fig. 9), making with each other any oblique angle GCE=*q*, we may always find two others CM and CK, which include a right angle MCK. Let the angle GCM =*p*; and by supposing ECK=π, we shall have $q+\pi-p=90°$, and therefore sin. π=cos. $(q-p)$, and sin. $(q+\pi)$=cos. *p*; whence (art. 34.) $\frac{CE^2}{CG^2}=\frac{\text{sin. }p.\text{ cos. }p}{\text{sin. }(q-p).\text{ cos. }(q-p)}=\frac{\text{sin. }2p}{\text{sin. }2\,(q-p)}=\frac{\text{sin. }2p}{\text{sin. }2q\text{ cos. }2p-\text{cos. }2q\text{ sin. }2p}$; therefore $\frac{CG^2}{CE^2}=$ sin. 2*q*. cot. 2*p* − cos. 2*q*; from which we obtain cot. 2GCM=cot. $2q+\frac{CG^2}{CE^2.\text{ sin. }2q}$, an equation which presents a solution always possible; but we have $\frac{CM^2}{CG^2}=\frac{\text{sin. }q.\text{ cos. }p}{\text{sin. }(q-p)}$, and $\frac{CG^2}{CM^2}=1-\frac{\text{tang. }p}{\text{tang. }q}$, therefore, tang. *p*=tang. $q-\frac{CG^2}{CM^2}$. tang. *q*; and as we have $CM^2+CR^2=CG^2+CE^2$, and CK.CM= CG.CE. sin. *q*, we shall have CM + CK= $\sqrt{(CG^2+2CG.CE\text{ sin. }q+CE^2)}$, and CM − CK= $\sqrt{(CG^2-2CG.CE\text{ sin. }q+CE^2)}$; by means of which such conjugate diameters as are perpendicular to each other may be formed.

41. Let CA and CE (Plate 47, fig. 11), be two conjugate semi-diameters of a conic section, which make with each other a right angle at the centre C; they are called principal diameters. Let the abscissa CP=*x*, the applicate PM=*y*, and we shall have, as we have already seen, $yy=\alpha-6xx$; and by supposing the principal semi-diameters AC=*a*, CE=*b*, we shall find $\alpha=bb$, and $C=\frac{b^2}{a^2}$; which gives $yy=bb-\frac{bbxx}{aa}$. This equation, which continues the same whether we take *x* and *y* positive or negative, shows that the curve will be composed of four parts all equal to each other, and similarly situated about the diameters AC and EF; that is to say, that the part ACE will be similar and equal to the part ACF; and the other two parts will be similar to these, and situated on the opposite side of the diameter EF.

42. If from the centre C, which we have taken for the origin of the abscissas, the right line CM

be drawn, it will be $=\sqrt{(x^2+y^2)}=\sqrt{(b^2-\frac{b^2x^2}{a^2}+x^2)}$; which shows that, if $b=a$, or CE=CA, we shall have $CM=\sqrt{b^2}=b=a$; in this case all right lines drawn through the centre to the curve will be equal to each other; and as this is the property of the circle, it is evident that the conic section, whose two principal conjugate diameters are equal to each other, is a circle, the equation of which referred to the perpendicular co-ordinates will be, by making $CP=x$, and $PM=y$, $yy=a^2-x^2$, and the radius of the circle will be $CA=a$.

43. But if b be not equal to a, we can never have for CM a rational expression in x. And yet there will be in the axis another point D, whence all right lines DM drawn to the curve may be expressed in a rational manner. In order to find this, let us make $CD=f$; then because $DP=f-x$, we shall have $DM^2=ff-2fx+x^2+b^2-\frac{b^2x^2}{a^2}=b^2+f^2-2fx+\frac{(a^2-b^2)x^2}{aa}$; an expression which will become a square, if $f^2=\frac{(aa-bb)(bb+ff)}{aa}$, or $o=aa-bb-ff$; which gives $f=\pm\sqrt{a^2-b^2}$. The axis AC will therefore have in it two points which possess this property, and both of them will be at a distance from the centre, $CD=\sqrt{a^2-b^2}$. We here have $DM^2=a^2-2x\sqrt{a^2-b^2}+\frac{(aa-bb)x^2}{aa}$, and $DM=a-\frac{x\sqrt{a^2-b^2}}{a}=AC-\frac{CD.CP}{AC}$. If we make $CP=o$, DM will become $=DE=a=AC$; but, if the abscissa CP be made $=CD$, or $x=\sqrt{a^2-b^2}$, the right line DM will become the applicate DG, and we shall have $DG=\frac{b^2}{a}=\frac{CE^2}{AC}$, or DG a third proportional to AC and CE.

44. This remarkable property, which belongs to the points D, determined as in the preceding article, has appeared worthy of attention; and as these points of the principal diameter also possess many other properties which distinguish them, they have, for that reason, received particular names. They are called *foci* of the conic section, and, because they are situated in the principal axis a, it is distinguished from its conjugate b, by calling the former the *principal* and *transverse axis*, and the latter simply the *conjugate axis*. The perpendicular applicate, which passes through either of the foci, is named the *semi-parameter*; for the whole parameter is the ordinate which passes through D, or the double of DG. This is also called the *latus rectum*. The semi-conjugate axis CE is therefore a mean proportional between the semi-parameter DG, and the semi-transverse axis AC. The extremities of the transverse axis, where it meets the curve, are called the summits or vertices; such is the point A: and the tangents drawn through these two points of the curve, are perpendicular to the transverse axis AC.

45. Let us suppose the semi-parameter $DG=c$, the distance from the focus to the vertex $AD=d$; we shall have $CD=a-d=\sqrt{a^2-b^2}$, and $DG=\frac{bb}{a}=c$, whence $bb=ac$, and $a-d=\sqrt{a^2-ac}$; therefore $ac=2ad-dd$, $a=\frac{dd}{2d-c}$, and $b=d\sqrt{\frac{c}{2d-c}}$. Thus, when the distance from the focus to the vertex $AD=d$, and the semi-parameter $DG=c$, are given, the conic section is determined. Let us now put $PC=x$, DM will be $=a-\frac{(a-d)x}{a}=\frac{dd}{2d-c}-\frac{(c-d)x}{d}$. Also let $DP=t$, x will be $=CD-t=\frac{(c-d)d}{2d-c}-t$; therefore DM becomes $=c+\frac{(c-d)t}{d}$. If we make the angle $ADM=v$, we shall have $\frac{t}{DM}=-\cos. v$, and therefore $d.DM=cd+(d-c)DM.\cos. v$, and $DM=\frac{cd}{d-(d-c)\cos. v}$, and $\cos. v=\frac{d(DM-DG)}{(d-c).DM}$.

Subdivision of Lines of the Second Order into Kinds.

46. The properties which have been previously developed, appertain equally to all lines of the second order, and no mention has been made of any variety which distinguishes them from each other. But, although these properties are common to all lines of the second order, yet they differ much from each other with regard to figure: hence it becomes necessary to distribute them into kinds, in order to facilitate the means of distinguishing their different figures, and of discovering the properties that belong to each kind in particular.

47. We have given, by only changing the axis and the origin of the abscissas, such a form to the general equation of lines of the second order, that they are all comprised in the equation $yy=\alpha+\beta x+\gamma xx$, in which x and y represent the perpendicular or rectangular co-ordinates; and since for each abscissa x, the applicate y has two values, the one positive and the other negative, that axis, in which the abscissas x are taken, will divide the curve into two equal and similar parts; there will consequently be an orthogonal diameter; therefore we may say that every conic section has an orthogonal diameter, which is indeed nothing else than the axis whereon the abscissas are taken.

48. There enters into this equation three constant quantities α, β, and γ, which, being capable of an infinite number of variations, indicate an infinite variety of curves, which in figure differ more or less from each other. For the same figure may result an infinite number of times from the proposed equation $yy=\alpha+\beta x+\gamma xx$; it being only necessary to change the origin of the abscissas, which is done by augmenting or diminishing the axis by a given quantity. Farther, the same figure comprised in the equation may be greater or less, so that there is an infinity of curve lines, which differ from each other in magnitude only; such are circles described with different radii. It follows, hence, that every variation in the letters α, β, and γ, does not produce a variety of species or kinds in lines of the second order.

49. The greatest difference of curve lines contained in the equation $yy=\alpha+\beta x+\gamma xx$, depends upon the nature of the coefficient γ, according as it is positive or negative. For if γ have a positive value, by making x infinite, the term γxx will become infinitely greater than the other terms $\alpha+\beta x$, and consequently the expression $\alpha+\beta x+\gamma xx$ obtains a positive value; the applicate y will likewise have a double value infinitely great, the one positive and the other negative; the same thing takes place if we make $x=-\infty$ (infinity). In this last case, the expression $\alpha+\beta x+\gamma xx$ will again

have an infinite and positive value. Wherefore, when γ is a positive quantity, the curve has four branches, each of which is infinitely extended: two of them correspond to the abscissa $x=+\infty$, and two to the abscissa $x=-\infty$. These curves which have four infinite branches, constitute one class of lines of the second order, and are known by the name of *hyperbolas*.

50. But if the coefficient γ have a negative value, by making $x=\infty$, the expression $\alpha+\beta x+\gamma xx$ will have a negative value, and therefore the applicate y will become imaginary. In this case, neither the abscissa nor the applicate can be infinite, and consequently no part of the curve can be infinitely extended; but it will be wholly included in a finite and determinate space. This second species of lines of the second order has obtained the name of *ellipses*, and they are comprised in this equation $yy=\alpha+\beta x+\gamma xx$, γ being supposed a negative quantity.

51. Since the value of γ, according as it is positive or negative, introduces into lines of the second order so great a difference, as to distinguish them into two kinds; if we make $\gamma=o$, which holds the middle place between positive and negative values, the curve which will result from it will also constitute a mean species between hyperbolas and ellipses; this class is named *parabolas*, the nature of which will be expressed by the equation $yy=\alpha+\beta x$. It is indifferent here whether β be a positive or a negative quantity; because the nature of the curve does not change when we make the abscissa negative. Let therefore β be a positive quantity; it is evident that, if the abscissa x increase to infinity, the applicate y may also be an infinite quantity, both positive and negative; whence it follows that the parabola has two infinite branches; but it cannot have more than two, because, by making $x=-\infty$, the value of the applicate y becomes imaginary.

52. We have, therefore, three species of lines of the second order, the *ellipse*, the *parabola*, and the *hyperbola*, which differ from each other in such a manner that it is impossible to confound them together. For their essential difference consists in the number of their infinite branches; the ellipse has none, but is wholly comprised in a finite space; the parabola has two; and the hyperbola four. Thus, having considered in general, in the former part of this treatise, the properties of the conic sections, there remains for us to consider the properties that are peculiar to each species.

53. Let us begin with the ellipse, the equation of which is $yy=\alpha+\beta x-\gamma xx$, the abscissas being taken in the orthogonal diameter. As the origin of the abscissas is arbitrary, if we supposed it to be removed by an interval of $\frac{\beta}{2\gamma}$, we shall have an equation of this form $yy=\alpha-\gamma xx$, in which the abscissas are computed from the centre of the figure. Therefore, let C be the centre (Plate 47, fig. 13), and AB the axis, the abscissa will be CP $=x$, and the applicate PM $=y$. We shall then have $y=o$, by taking $x=\pm\sqrt{\frac{\alpha}{\gamma}}$; and if x exceed these limits $+\sqrt{\frac{\alpha}{\gamma}}, -\sqrt{\frac{\alpha}{\gamma}}$, the applicate will become imaginary; which shows that the entire curve is contained within those limits. Hence we shall have CA $=$ CB $=\sqrt{\frac{\alpha}{\gamma}}$; then, if $x=o$, CD $=$ CE $=\sqrt{\alpha}$. Let it be supposed, therefore, that the semi-diameter, or the semi-axis major CA $=$ CB $=a$, and the conjugate semi-axis CD $=$ CE $=b$, then, $\alpha=bb$, and $\gamma=\frac{bb}{aa}$; whence results this equation for the ellipse $yy=bb-\frac{bbxx}{aa}=\frac{bb}{aa}(aa-xx)$.

54. When the conjugate semi-axes a and b become equal to each other, then the ellipse is transformed into a circle, because $y^2=a^2-x^2$ or $y^2+x^2=a^2$; for we shall have CM $=\sqrt{x^2-y^2}$ $=a$; and consequently all the points M of the curve will be equally distant from the centre C; which is the property of the circle. But if the semi-axes a and b be unequal, the curve will be lengthened; and either AB will be greater than DE, or DE greater than AB. But as we may change the conjugate ones AB and DE, and as it is indifferent in which of the two we take the abscissas, let us suppose AB to be the greater, or that a is greater than b, we shall find in this axis the foci of the ellipse F and G, by taking CF $=$ CG $=\sqrt{a^2-b^2}$; the semi-parameter will be $=\frac{bb}{a}$; which expresses the magnitude of the applicate drawn to either of the foci F or G.

55. If we draw from each focus to a point M of the curve the two right lines FM and GM; we have seen already that FM $=$ AC $-\frac{\text{CF.CP}}{\text{AC}}=a-\frac{x\sqrt{a^2-b^2}}{a}$, and GM $=a+\frac{x\sqrt{a^2-b^2}}{a}$; and therefore FM $+$ GM $=2a$. Therefore, if to any point M of the curve, there be drawn two right lines FM and GM from the foci, their sum will always be equal to the greater axis AB $=2a$; which makes known a remarkable property of the foci, and, at the same time furnishes us with an easy mechanical method of describing the ellipse.

56. If to the point M there be drawn the tangent TMt which meets the axes in the points T and t, we shall have, as demonstrated above, CP : CA :: CA : CT; therefore, CT $=\frac{aa}{x}$, and, by changing the co-ordinates, C$t=\frac{bb}{y}$. Whence TP $=\frac{aa}{x}-x$, TF $=\frac{aa}{x}-\sqrt{a^2-b^2}$, and TA $=\frac{aa}{x}-a$. TP will therefore become $=\frac{aa-xx}{x}=\frac{aayy}{bbx}$, and TM $=\frac{y\sqrt{b^4x^2+a^4y^2}}{bbx}$; therefore tang. CTM $=\frac{bbx}{aay}$; sin. CTM $=\frac{bbx}{\sqrt{(b^4x^2+a^4y^2)}}$; and cos. CTM $=\frac{aay}{\sqrt{(b^4x^2+a^4y^2)}}$. Consequently, if AV be raised from the point A perpendicular to the axis, and touching the curve, we shall have AV $=\frac{a(a-x)}{x}\cdot\frac{bbx}{aay}=\frac{bb.(a-x)}{ay}=b\sqrt{\frac{a-x}{a+x}}$, because $ay=b\sqrt{a^2-x^2}$.

57. Since FT $=\frac{a^2-x\sqrt{a^2-b^2}}{x}$, and FM $=\frac{a^2-x\sqrt{a^2-b^2}}{a}$, FT : FM :: a : x; we shall have,

in like manner, because $GT=\frac{a^2+x\sqrt{a^2-b^2}}{x}$, and $GM=\frac{a^2+x\sqrt{a^2-b^2}}{a}$, $GT : GM :: a : x$; therefore $FT : FM :: GT : GM$. But, $FT : FM ::$ sin. FMT : sin. CTM, and $GT : GM ::$ sin. GMt : sin. CTM; therefore, sin. FMT = sin. GMt, and consequently the angle FMT = the angle GMt. Therefore, the two right lines drawn from the foci to any point M in the curve, make equal angles with the tangent drawn to that point M; which is the principal property of the foci.

58. As we have $GT : GM :: a : x$, because $CT=\frac{aa}{x}$, we shall also have $CT : CA :: a : x$; whence we obtain $GT : GM :: CT : CA$. Therefore, if from the centre C the line CS be drawn parallel to GM, to meet the tangent in S, $CS=CA=a$. In like manner, if from the point C a line be drawn parallel to FM, and terminating in the tangent, it will also be equal to $CA=a$. Since $TM=\frac{y}{bbx}\sqrt{b^4x^2+a^4y^2}$, we shall have, because $a^2y^2=a^2b^2-b^2x^2$, $TM=\frac{y}{bx}\sqrt{(a^4-x^2(a^2-b^2))}$; but $FT.GT=\frac{a^4-x^2(a^2-b^2)}{xx}$; therefore $TM=\frac{y}{b}\sqrt{FT.GT}$. As $TG : TC :: TM : TS$, TS will be $=\frac{TM.CT}{TG}$; and consequently $TS=\frac{y.CT}{b}\sqrt{\frac{FT.}{GT}}=\frac{y.CT.FT}{b\sqrt{FT.GT}}=\frac{y^2.CT.TF}{b^2.TM}$. Then $PT=\frac{a^2y^2}{b^2x}=\frac{CT.y^2}{b^2}$; therefore $TS=\frac{PT.FT}{TM}$, and consequently $TM : PT :: FT : TS$; which shews that the triangles TMP and TFS are similar, and therefore the right line FS drawn from the focus to the tangent is perpendicular to it. We may conclude, therefore, from these results, that in every case $SV=\frac{AF.MV}{GM}$.

59. Hence, if from one of the foci F a right line FS be drawn perpendicular to the tangent at S, and the point S and the centre C be joined, the right line CS will always be equal to the semi-transverse axis $AC=a$; but as $TM : y :: TF : FS$, $FS=\frac{y.TF}{TM}=\frac{b.TF}{\sqrt{FT.GT}}=b\sqrt{\frac{FT}{GT}}$. Therefore $GT : FT :: GM : FM :: CD^2 : FS^2$; but the perpendicular let fall from the other focus upon the tangent, will be $=b\sqrt{\frac{GT}{FT}}$; consequently, the less semi-axis $CD=b$ will be a mean proportional between these perpendiculars. Now demit the perpendicular CQ from the centre C to the tangent at Q, and we shall have $TF : FS :: CT : CQ$. Therefore $CQ=\frac{b.CT}{\sqrt{FT.GT}}=\frac{bx.CT}{a\sqrt{FM.GM}}=\frac{ab}{\sqrt{FM.GM}}$. Whence $CQ-FS=\frac{b.CF}{\sqrt{FT.GT}}=CX$, FX being drawn parallel to the tangent. It may hence be inferred, that $CQ-CX=\frac{b.TF}{\sqrt{FT.GT}}$, and $CQ+CX=\frac{b.TG}{\sqrt{FT.GT}}$; whence $CQ^2-CX^2=b^2$, and $CX=\sqrt{CQ^2-b^2}$. Therefore, the minor axis being given, we find upon the perpendicular CQ the point X, where the perpendicular ought to be raised that will pass through the focus F.

60. After having shewn the properties relative to the foci, we will proceed to those of any two conjugate diameters. We know that CM being a semi-diameter, its conjugate may be formed, by drawing from the centre the line CK parallel to the tangent TM. Put $CM=p$, $CK=q$, and the angle $MCK=CMT=S$, we shall have $p^2+q^2=a^2+b^2$, and $pq.$ sin. $S=ab$, as already shown; but $p^2=x^2+y^2=b^2+\frac{(a^2-b^2)x^2}{a^2}$, and $q^2=a^2+b^2-p^2=a^2-\frac{(a^2-b^2)x^2}{a^2}=FM.GM$; in like manner $p^2=FK.GK$. Besides, since $CQ=\frac{ab}{\sqrt{FM.GM}}$, we shall have sin. CMQ = sin. $S=\frac{ab}{p\sqrt{FM.GM}}$. We shall then have $TM : TP :: \frac{y}{b}\sqrt{FT.GT} : \frac{a^2y^2}{b^2x^2} :: \sqrt{FM.GM} : \frac{ay}{b} :: CK : CR$; therefore $CR=\frac{ay}{b}$, $KR=\frac{bx}{a}$, and consequently $CR.KR=CP.CM$. Moreover, we shall find that sin. $FMS=\frac{b}{\sqrt{(CM.FM)}}=\frac{b}{q}$; and as $x=CP=\frac{a\sqrt{p^2-b^2}}{\sqrt{a^2-b^2}}$, and $y=\frac{b\sqrt{a^2-p^2}}{\sqrt{a^2-b^2}}=PM$, $CR=\frac{a\sqrt{a^2-p^2}}{\sqrt{a^2-b^2}}$, and $KR=\frac{b\sqrt{p^2-b^2}}{\sqrt{a^2-b^2}}$, and we shall have tang. $ACM=\frac{y}{x}$ and tang. $2ACM=\frac{2xy}{x^2-y^2}=\frac{2ab\sqrt{(a^2-p^2)(p^2-b^2)}}{(a^2+b^2)p^2-2a^2b^2}$. But $ab=pq$ sin. s, $a^2+b^2=p^2+q^2$, and $\sqrt{(a^2-p^2)(p^2-b^2)}=-pq.$ cos. s; therefore tang. $2ACM=\frac{2q^2 \text{ sin. } s. \text{ cos. } s}{p^2+q^2 \text{ cos. } 2s}$, as the cos. s is negative. So that $CK^2=MT.Mt$; but from the preceding we obtain $MV=q\sqrt{\frac{AP}{BP}}$, and $AV=b\sqrt{\frac{AP}{BP}}$; therefore we have $AV : MV :: b : q :: CE : CK$; whence if the right lines AM and EK be drawn, they will be parallel to each other.

61. Since pq sin. $s=ab$, pq is greater than ab, and as $p^2+q^2=a^2+b^2$, the quantities p and q approach more to the ratio of equality than those of a and b; therefore, of all conjugate diameters, those which are perpendicular to each other differ most: hence there will be two conjugate diameters which are equal to each other. In order to determine them, let $q=p$, and we shall have $2p^2=a^2+b^2$, and $p=q=\sqrt{\frac{a^2+b^2}{2}}$, sin. $s=\frac{2ab}{a^2+b^2}$, and cos. $s=\frac{-a^2+b^2}{a^2+b^2}$; therefore sin. $\frac{1}{2}s=\sqrt{\frac{a^2}{a^2+b^2}}$, cos. $\frac{1}{2}s=\sqrt{\frac{b^2}{a^2+b^2}}$; which gives tang. $\frac{1}{2}s=\frac{a}{b}$ = tang. CEB, and $MCK=2CEB=AEB$. Also $CP=\frac{a}{\sqrt{2}}$, $PM=\frac{b}{\sqrt{2}}$. Consequently the two conjugate semi-diameters CM, CK, which are equal to

each other, will be parallel to the chords AE and BE.

62. If the origin of the abscissas be taken at the vertex A, and we put AP$=x$, and PM$=y$, as before, x will now $=a-x$, and we shall have this equation $y^2=\frac{b^2}{a^2}(2ax-x^2)=\frac{2b^2}{a}x-\frac{b^2}{a^2}x^2$, in which it is evident that $\frac{2b^2}{a}$ expresses the parameter of the ellipse. Let us suppose the semi-parameter or the applicate to the focus $=c$, and the distance AF from the focus to the vertex $=d$, then we shall have $\frac{b^2}{a}=c$, and $a-\sqrt{a^2-b^2}=d=a-\sqrt{a^2-ac}$, whence we obtain $2ad-d^2=ac$, and $a=\frac{d^2}{2d-c}$. We shall therefore have $y^2=2cx-\frac{c(2d-c)xx}{dd}$ for the equation between the perpendicular co-ordinates, x and y of the ellipse, when the abscissas are taken in the principal axis AB, and commence at the vertex A; taking also the distance AF$=d$ from the focus to the vertex, and the semi-parameter$=c$, for constant quantities. It is necessary to remark here, that $2d$ must always be greater than c, because AC$=a=\frac{dd}{2d-c}$, and CD$=b=d\sqrt{\frac{c}{2d-c}}$.

63. If $2d=c$, we shall have $yy=2cx$, an equation which we have already seen belongs to the parabola; for the equation $yy=a+6x$, which is given above, assumes this form by removing the origin of the abscissas by a quantity $=\frac{a}{6}$. Therefore, let MAN (Plate 47, fig. 14), be a parabola, the nature of which is expressed by this equation $yy=2cx$, between the abscissa AP$=x$, and the applicate PM$=y$. The distance from the focus to the vertex will be AF$=d=\frac{1}{2}c$, and the semi-parameter FH$=c$; and for every other point of the curve, PM$^2=$ 2FH.AP; whence it follows that by supposing the abscissa AP to be infinite, the applicates PM and PN will also become infinite; and consequently the curve will be infinitely extended on both sides of the axis AP. But if we make the abscissa x negative, the applicate becomes imaginary, and consequently no portion of the curve answers to the axis on that side of the point A towards T.

64. The equation of an ellipse expressing a parabola when we make $2d=c$, it is evident that the parabola is nothing but an ellipse of which the semi-axis $a=\frac{d^2}{2d-c}$ becomes infinite; wherefore all the properties which have been obtained for the ellipse apply to the parabola also, by making the axis a infinite. And as AF$=\frac{1}{2}c$, FP will be $=x-\frac{1}{2}c$; and by drawing from the focus F to a point M of the curve the right line FM, we shall have FM$^2=x^2-cx+\frac{1}{4}c^2+y^2=x^2+cx+\frac{1}{4}c^2$, and therefore FM$=x+\frac{1}{2}c=AP+$AF; which is the chief focal property of the parabola.

65. Since the parabola is only an ellipse whose diameter is infinitely prolonged, we shall treat this curve as if it were really an ellipse; and for this purpose, let the semi-axis AC$=a$, a being an infinite quantity, so that the centre C may be at an infinite distance from the vertex A. Let there be a tangent MT drawn to the point M, to meet the axis in T; as CP : CA : : CA : CT, CT will be $=\frac{a^2}{a-x}$, because CP$=a-x$, and therefore AT$=\frac{ax}{a-x}$; but since a is an infinite quantity, the abscissa x will disappear with respect to this last quantity a, and we shall have $a-x=a$; and consequently AT$=x=$AP; which may be demonstrated otherwise as follows; since AT$=\frac{ax}{a-x}$, we shall have AT$=x+\frac{x^2}{a-x}$; but because the denominator of the fraction is infinity, the numerator being finite, the value of the fraction becomes nothing, and consequently AT$=$AP$=x$.

66. If from any point M in the curve to the centre C of a parabola infinitely distant a line MC be drawn, it will be parallel to the axis, and it will also be a diameter of the curve, which will bisect all the chords that are parallel to the tangent MT. For example, if we suppose the chord or the ordinate mn parallel to the tangent MT, it will be bisected in p by the diameter Mp. Every right line drawn in the parabola parallel to the axis AP, will therefore be an oblique angled diameter. In order to determine its nature, let Mp be $=t$, $pm=u$; and draw from the point m to the axis the perpendicular msr, because PT$=2x$, and MT$=\sqrt{4x^2+2cx}$, we shall have $\sqrt{(4xx+2cx)}$: $2x$: $\sqrt{2cx}$: : pm : ps : ms; which gives $ps=\frac{2xu}{\sqrt{(4x^2+2cx)}}=u\sqrt{\frac{2x}{2x+c}}$, and $ms=u\sqrt{\frac{c}{2x+c}}$. Therefore A$r=x+t+u\sqrt{\frac{2x}{2x+c}}$, and $mr=\sqrt{2cx}+u\sqrt{\frac{c}{2x+c}}$; but $mr^2=2c.$Ar; therefore $2cx+2cu\sqrt{\frac{2x}{2x+c}}+\frac{cuu}{2x+c}=2cx+2ct+2cu\sqrt{\frac{2x}{2x+c}}$, and $u^2=2t(2x+c)=4$FM.t, or $pm^2=4$FM.Mp. The sine of the oblique angle mps will be $=\sqrt{\frac{c}{2x+c}}=\sqrt{\frac{\text{AF}}{\text{FM}}}$; its cosine $=\sqrt{\frac{2x}{2x+c}}=\sqrt{\frac{\text{AP}}{\text{FM}}}$; and consequently sin. $2mps=\frac{2\sqrt{2cx}}{2x+c}=\frac{y}{\text{FM}}=$sin. MF$r$. Therefore the angle $mps=$MTP$=\frac{1}{2}$MFr.

67. As MF$=$AP$+$AF, because AP$=$AT, we shall have FM$=$FT; the triangle MFT will be isosceles, and the angle MFr will be $=2$MTA; which has been already proved; and since MT$=2\sqrt{x(x+\frac{1}{2}c)}$, MT will be $=2\sqrt{\text{AP.FM}}$; if therefore a perpendicular FS be let fall from the focus F to the tangent at S, MS$=$TS$=\sqrt{\text{AP.FM}}=\sqrt{\text{AT.TF}}$; whence this proportion is obtained, AT : TS : : TS : TF, which shows that the point S is in the right line AS, perpendicular to the axis at the vertex A. But AS$=\frac{1}{2}$PM, and AS : TS : : AF : FS. Therefore FS$=\sqrt{\text{AF.FM}}$, and FS will be a mean proportional between AF and FM. Besides, AS : MS : : AS : TS : : FS : FM : : $\sqrt{\text{AF}}$: $\sqrt{\text{FM}}$. If at the point M a perpendicular MW be raised upon the tangent to meet the axis in W, we shall have PT : PM : : PM : PW, or $2x$: $\sqrt{2cx}$: : $\sqrt{2cx}$: PW, whence PW$=c$. Therefore the part PW of the axis intercepted between the applicate PM and the normal WM, is every where of a constant magnitude, being equal to the semi-parameter, or the applicate FH. We shall also have FW$=$FT$=$FM, and MW$=2\sqrt{\text{AF.FM}}$.

68. Let us now treat of the hyperbola, the nature of which is expressed by this equation $yy=\alpha+\beta x+\gamma xx$, the abscissas being taken in the orthogonal diameter. If the origin of the abscissas be removed to a distance $=\frac{\beta}{2\gamma}$, the equation will assume this form $yy=\alpha+\gamma xx$, in which the abscissas are reckoned from the centre. But it is necessary that γ be a positive quantity; as to the value of α it is indifferent whether it be a positive or negative; for by changing the co-ordinates x and y, the quantity α changes from positive to negative, and the contrary. Let it be supposed that α is a negative quantity, and $yy=\gamma xx-\alpha$; it is evident that the applicate y becomes nothing in two places, viz. when $x=+\sqrt{\frac{\alpha}{\gamma}}$ and $x=-\sqrt{\frac{\alpha}{\gamma}}$. Let C be the centre, A and B the points where the axis is cut by the curve (Plate 48, fig. 1); having made the semi-axis $CA=CB=a$, we shall have $a=\sqrt{\frac{\alpha}{\gamma}}$, and $\alpha=\gamma a^2$, whence results $yy=\gamma xx-\gamma aa$. Thus whenever xx is less than aa, the applicate becomes imaginary, which shows that no part of the curve corresponds to the whole of the axis AB. But, if xx be taken greater than aa, the applicates increase more and more until they become infinite. Therefore, the hyperbola has four branches AI, A*i*, BK, B*k*, which extend to infinity, and are equal and similar to each other; this is the principal property of the hyperbola.

69. Since by making $x=o$, we shall have $yy=-\gamma aa$, the hyperbola will not have, like the ellipse, a conjugate axis, because the applicate to the centre C is imaginary. This conjugate axis will, therefore, be imaginary; but in order to preserve some analogy with the ellipse, let us make it $=b\sqrt{-1}$, so that $\gamma a^2=b^2$, and $\gamma=\frac{b^2}{a^2}$. Having made the abscissa $CP=x$, and the applicate $PM=y$, we shall have $y^2=\frac{b^2}{a^2}(x^2-a^2)$; which shows that the equation for the ellipse, before treated, viz. $y^2=\frac{b^2}{a^2}(a^2-x^2)$, becomes an equation of the hyperbola, by putting $-b^2$ for b^2. By reason of this affinity, the properties of the ellipse, which have been already deduced, are easily applied to the hyperbola. For example, the distance from the foci to the centre of the ellipse was $\sqrt{a^2-b^2}$; for the hyperbola, it will be $CF=CG=\sqrt{a^2+b^2}$. Therefore, $FP=x-\sqrt{a^2+b^2}$, and $GP=x+\sqrt{a^2+b^2}$; then, because $y^2=-b^2+\frac{b^2x^2}{a^2}$, FM will be $=\sqrt{(a^2+x^2+\frac{b^2x^2}{a^2}-2x\sqrt{a^2+b^2})}=\frac{x\sqrt{a^2+b^2}}{a}-a$, and $GM=\sqrt{(a^2+x^2+\frac{b^2x^2}{a^2}+2x\sqrt{a^2+b^2})}=\frac{x\sqrt{a^2+b^2}}{a}+a$. Therefore, having drawn from each focus to a point M of the curve the two right lines FM, GM, we shall have $FM+AC=\frac{CP.CF}{CA}$, and $GM-AC=\frac{CP.CF}{CA}$. The difference $GM-FM$ of these two lines is therefore equal to 2AC. From this it is seen that, if in the ellipse the sum of these two lines is equal to the principal axis; in the hyperbola, on the contrary, it is their difference which is equal to the same axis.

70. The position of the tangent MT may likewise be hence obtained; for we have always in lines of the second order, $CP : CA :: CA : CT$, whence $CT=\frac{aa}{x}$, and $PT=\frac{x^2-a^2}{x}=\frac{a^2y^2}{b^2x}$; it follows that $MT=\frac{y}{b^2x}\sqrt{b^4x^2+a^4y^2}=\frac{y}{bx}\sqrt{a^2x^2+b^2x^2-a^4}$. But $FM.GM=\frac{a^2x^2+b^2x^2-a^4}{a^2}$; therefore $MT=\frac{ay}{bx}\sqrt{FM.GM}$. We have then $FT=\sqrt{a^2+b^2}-\frac{a^2}{x}$, and $GT=\sqrt{a^2+b^2}+\frac{a^2}{x}$. Therefore $FT : FM :: a : x$, and $GT : GM :: a : x$; whence it follows that $FT : GT :: FM : GM$, a proportion which shows that the angle FMG is bisected by the tangent MT, and that $FMT=GMT$. The right line CM produced will be an oblique angled diameter which bisects all the ordinates parallel to the tangent MT.

71. Let the perpendicular CQ be let fall from the centre C to the tangent at Q, we shall then have $TM : PT : PM :: CT : TQ : CQ$, or $\frac{ay}{bx}\sqrt{FM.GM} : \frac{a^2y^2}{b^2x} : y :: \frac{a^2}{x} : TQ : CQ$, whence is obtained $TQ=\frac{a^3y}{bx\sqrt{FM.GM}}$, and $CQ=\frac{ab}{\sqrt{FM.GM}}$. In like manner, let the perpendicular FS be drawn from the focus F to the tangent at S, and $TM : PT : PM :: FT : TS : FS$, or $\frac{ay}{bx}\sqrt{FM.GM} : \frac{a^2y^2}{b^2x} : y :: \frac{a.FM}{x} : TS : FS$; whence $TS=\frac{a^2y.FM}{bx\sqrt{FM.GM}}$, and $FS=\frac{b.FM}{\sqrt{FM.GM}}$; likewise, if the perpendicular G*s* be let fall from the focus G to the tangent at *s*, we shall have $Ts=\frac{a^2y.GM}{bx\sqrt{FM.GM}}$; and $Gs=\frac{b.GM}{\sqrt{FM.GM}}$. We have therefore $TS.Ts=\frac{a^4y^2}{b^2x^2}=\frac{a^2(x^2-a^2)}{xx}=CT.PT$, and $TS : CT :: PT : Ts$; then $FS.Gs=b^2$. And, as $QS=Qs$, we shall have $QS=\frac{TS+Ts}{2}=\frac{a^2y(FM+GM)}{2bx\sqrt{FM.GM}}=\frac{ay\sqrt{(a^2+b^2)}}{b\sqrt{FM.GM}}=Qs$; whence it follows that $CS^2=CQ^2+QS^2=\frac{a^2b^4+a^4y^2+a^2b^2y^2}{b^2.FM.GM}=\frac{a^2b^4+(a^2+b^2)(b^2x^2-a^2b^2)}{b^2.FM.GM}=\frac{(a^2+b^2)x^2-a^4}{FM.GM}=a^2$. Hence, as in the ellipse, the right line $CS=a=CA$; therefore $CQ+FS=\frac{bx\sqrt{(a^2+b^2)}}{a\sqrt{(FM.GM)}}$, and consequently $(CQ+FS)^2-CQ=\frac{b^2x^2(a^2+b^2)-a^4b^2}{a^2.FM.GM}=b^2$. Therefore, if from the focus F the right line FX be drawn parallel to the tangent, and intersecting the perpendicular CQ produced in X, we shall have $CX=\sqrt{(b^2+CQ^2)}$, a property similar to that which has been found for the ellipse.

72. If from the vertices A and B, perpendicu-

lars to the axis be raised and meet the tangent in V and v, because $AT=\frac{a(x-a)}{x}$, and $BT=\frac{a(x+a)}{x}$, the proportion PT : PM : : AT : AV : : BT : Bv, will give $AV=\frac{b^2(x-a)}{ay}$, and $Bv=\frac{b^2(x+a)}{ay}$; therefore $AV.Bv=\frac{b^4(x^2-a^2)}{a^2y^2}=b^2$, or AV.B$v$=FS.G$s$. We have then PT : TM : : AT : TV : : BT : Tv; therefore $TV=\frac{b(x-a)}{xy}\sqrt{FM.GM}$, and $Tv=\frac{b(x+a)}{xy}\sqrt{FM.GM}$; whence is obtained $TV.Tv=\frac{a^2}{x^2}FM.GM=FT.GT$. From this may also be drawn, in a similar manner, several corollaries.

73. From CT being $=\frac{aa}{x}$, it evidently follows that, as the abscissa $CP=x$ increases, the interval CT will decrease; also that the tangent, which touches the curve produced to infinity will pass through the centre C, and GT will become $=o$; or, since tang. $PTM=\frac{PM}{PT}=\frac{b^2x}{a^2y}$, if the point M be infinitely distant, or if $x=\infty$; then $y=\frac{b}{a}\sqrt{x^2-a^2}=\frac{bx}{a}$. Therefore the tangent of the curve infinitely produced will pass through the centre C, and will make with the axis an angle ACD, the tangent of which $=\frac{b}{a}$. Hence, if from the vertex A a perpendicular to the axis $AD=b$ be drawn, and infinitely produced both ways, it will not touch the curve in any point; but the curve will approximate more and more to the right line CK, until they become one at an infinite distance. The same thing will take place with respect to the part Ck, which will in a similar manner be compounded with the branch Bk; and if on the other side, the right line KCi be drawn, making the same angle, it will coincide with the branches BK and Ai infinitely produced. This kind of right lines, to which a curve continually approaches without reaching, except at an infinite distance, are called *asymptotes*; thus the two right lines ICk, KCi, are two asymptotes of the hyperbola.

74. The asymptotes, therefore, intersect each other in the centre C of the hyperbola, and form with the axis an angle ACD=ACd, whose tangent $=\frac{b}{a}$, and the tangent of its double $DCd=\frac{2ab}{a^2-b^2}$; which shews that if $b=a$, the angle DCd under which the asymptates intersect each other will be a right angle. In this case the hyperbola is said to be equilateral; but, since we have $AC=a$, $AD=b$, we shall have $CD=Cd=\sqrt{a^2+b^2}$; wherefore, if from the focus G upon either of the asymptotes a perpendicular GH be let fall, because $CG=\sqrt{a^2+b^2}=CD$, we shall have $CH=AC=BC=a$, and $GH=b$.

75. Let the ordinate $MPN=2y$ be produced both ways, until it meet the asymptotes in the points m and n, then $Pm=Pn=\frac{bx}{a}$, and $Cm=Cn=\frac{x\sqrt{a^2+b^2}}{a}=FM+AC=GM-AC$; we shall also have $Mm=Nn=\frac{bx-ay}{a}$, and $Nm=Mn=\frac{bx+ay}{a}$; therefore $Mm.Nm=Mm.Mn=\frac{b^2x^2-a^2y^2}{a^2}=b^2$, because $a^2y^2=b^2x^2-a^2b^2$. We shall therefore have every where $Mm.Nm=Mm.Mn=Nn.Nm=Nn.Mn=b^2=AD^2$. Let M$r$ be drawn from the point M parallel to the asymptote Cd, and $2b:\sqrt{a^2+b^2}::Mm:mr(Mr)$; therefore $mr=Mr=\frac{(bx-ay)\sqrt{a^2+b^2}}{2ab}$, and $Cm-mr=Cr=\frac{(bx+ay)\sqrt{a^2+b^2}}{2ab}$. We, therefore, may conclude that $Mr.Cr=\frac{(b^2x^2-a^2y^2)(a^2+b^2)}{4a^2b^2}=\frac{a^2+b^2}{4}$, or, by drawing from A the line AE parallel to the asymptote Cd, we shall have $AE=CE=\frac{1}{2}\sqrt{a^2+b^2}$; and consequently $Mr.Cr=AE.CE$, the chief property of the hyperbola in respect to its asymptotes.

76. Hence, if we take the abscissa $CP=x$ (Plate 48, fig. 2), upon one asymptote, reckoning from the centre, and suppose the applicate $PM=y$ parallel to the other asymptote; we shall have $yx=\frac{a^2+b^2}{4}$, by making $AC=BC=a$, and $AD=Ad=b$; or else, by making $AE=CE=h$, $yx=h^2$, and $y=\frac{hh}{x}$. Therefore, by supposing $x=o$, y becomes $=\infty$, and reciprocally, by making $x=\infty$, y becomes $=o$. Let there now be drawn through a point M of the curve a right line QMNR, parallel to a right line GH taken at pleasure, and suppose $CQ=t$, $QM=u$, then GH : CH : CG : : u : PQ : PM; therefore $PQ=\frac{CH}{GH}.u$; $PM=\frac{CG}{GH}.u$; which gives $y=\frac{CG}{GH}.u$, and $x=t-\frac{CH}{GH}.u$; we shall have, by the substitution of these values, $\frac{CG}{GH}tu-\frac{CH.CG}{GH^2}u^2=h^2$ or $u^2=\frac{GH}{CH}tu+\frac{GH^2}{CH.CG}h^2=o$. The applicate u will therefore have two values, viz. QM and QN, the sum of which $=\frac{GH}{CH}t=QR$, and the rectangle $QM.QN=\frac{GH^2}{CH.CG}h^2$.

77. Since $QM+QN=QR$, we have $QM=RN$ and $QN=RM$. Consequently, if the points M and N coincide, in which case the line QR becomes a tangent, it will be bisected in the point of contact. For example, if the right line XY touch the hyperbola, the point of contact Z will be situated in the middle of the line XY. Hence, if from the point Z there be drawn ZV, parallel to the other asymptote, we shall have $CV=VY$; which furnishes a ready method of drawing a tangent to any point Z of the hyperbola. By taking $VY=CV$, the right line which passes Y and Z will touch the hyperbola in the point Z. The equality $CV.ZV=h^2=\frac{a^2+b^2}{4}$ will give $CX.CY=a^2+b^2=CD^2=CD.Cd$, which indicates that, if the two lines DX and dY be drawn they will be parallel to each other, and gives therefore an easy

method of drawing as many tangents to the curve as we please.

78. Since the rectangle $QM . QN = \frac{GH^2}{CH . CG} h^2$, it is evident that wherever the line QR parallel to HG be drawn, the rectangle QM . QN will always be of the same magnitude. Therefore, $QM . QN = QM . MR = QN . NR = \frac{GH^2}{CH . CG} b^2$. Hence, if we conceive a tangent to be drawn parallel to QR, because the part between the asymptotes will be bisected in the point of contact, by supposing half of this tangent to be denoted by q, we shall always have $QM . QN = QM . MR = RN . RM = RN . NQ = q^2$; a remarkable property of the hyperbolas described between the asymptotes.

79. As the hyperbola is composed of two parts diametrically opposite to each other, I*Ai* and K*Bk*, these properties not only hold good for the right lines situated between the asymptotes which intersect the same portion of the curve in two points, but also for those which meet the opposite hyperbolas. Thus, let there be drawn through the point M parallel to G*h*, the right line M*qrn* to the opposite hyperbola; and make $Cq = t$, and $pM = u$, then because of the similar triangles CG*h* and PM*q*; we shall have $PM = y = \frac{CG}{Gh} u$, and $qP = x - t = \frac{Ch}{Gh} u$; whence we obtain $x = t + \frac{Cb}{Gb} u$; and since we have $xy = hh$, we shall have $\frac{CG}{Gb} tu + \frac{CG . Cb}{Gb^2} u^2 = b^2$, or $u^2 + \frac{Gh}{Ch} tu - \frac{Gb^2}{CG . Gh} b^2 = o$.

80. The applicate u will therefore have two values, viz. qM and $-qn$; of which qn is taken negative, because it falls on the other side of the asymptote CP which has been taken for the axis. The sum of these two roots $qM - qn$ will therefore $= -\frac{Gb}{Ch} t = -qr$; and consequently $qn - qM = qr$; whence it follows that, $qM = rn$, and $qn = rM$. The equation also shews that the product of the roots $-qM . qn = -\frac{Gh^2}{CG . Ch} h^2$, or $qM . qn = qM . rM = rn . qn = rn . rM = \frac{Gh^2}{CG . Ch} b^2$. These rectangles, wherever the parallel lines M*n* and G*h* be drawn, are always of a constant magnitude. Such are the principal properties of each species of lines of the second order; which, united with those which were found to belong to the conic sections in general, present almost an infinite variety of properties worthy of remark.

CO'NICALLY. *ad.* In form of a cone. (*Boyle*).

CO'NICALNESS. *s.* (from *conical.*) The state or quality of being conical.

To CONJE'CT. *v. n.* (*conjectum*, Latin.) To guess; to conjecture: not in use (*Shak.*).

CONJE'CTOR. *s.* (from *conject.*) A guesser; a conjecturer (*Swift*).

CONJE'CTURABLE. *a.* (from *conjecture.*) Possible to be guessed.

CONJE'CTURAL. *a.* (from *conjecture.*) Depending on conjecture (*Broome*).

CONJECTURA'LITY. *s.* (from *conjectural.*) That which depends upon guess (*Bro.*).

CONJE'CTURALLY. *ad.* (from *conjectural.*) By guess; by conjecture (*Hooker*).

CONJE'CTURE. *s.* (*conjectura*, Latin.) 1. Guess, imperfect knowledge (*South*). 2. Idea; notion: not in use (*Shakspeare*).

To CONJE'CTURE. *v. a.* (from the noun.) To guess; to judge by guess (*South*).

CONJE'CTURER. *s.* (from *conjecture.*) A guesser; one who forms opinion without proof (*Addison*).

CONIFERÆ. In botany, the fifteenth order in Linnéus's fragments of a natural method: and the fifty-first of the natural orders, at the end of Genera Plantarum. Containing the cone-bearing trees, as fir, pine, cypress, thuja, &c.

CONI'FEROUS. *a.* (*conus*, and *fero*, Lat.) Such trees are *coniferous* as bear a fruit of a figure approaching to that of a cone (*Quincy*).

To CONJO'BBLE. *v. n.* To concert; to settle; to discuss; a low word (*L'Estrange*).

To CONJO'IN. *v. a.* (*conjoindre*, Fr.) 1. To unite; to consolidate into one (*Dryden*). 2. To unite in marriage (*Shakspeare*). 3. To associate; to connect (*Taylor*).

To CONJO'IN. *v. n.* To league; to unite (*Sh.*).

CONJO'INT. *a.* (*conjoint*, Fr.) United; connected; associate.

CONJOINT, or CONJUNCT, in the ancient music, is applied to two or more sounds heard at the same time.

CONJO'INTLY. *ad.* In union; together; in association; jointly (*Brown*).

CO'NJUGAL. *a.* (*conjugalis*, Lat.) Matrimonial; belonging to marriage (*Swift*).

CO'NJUGALLY. *ad.* (from *conjugal.*) Matrimonially; connubially.

To CO'NJUGATE. *v. a.* (*conjugo*, Latin.) 1. To join; to join in marriage (*Wotton*). 2. To inflect verbs.

CO'NJUGATE. *a.* (*conjugatus*, Latin.) Agreeing in derivation with another word (*Bramhall*).

CONJUGATE AXIS, or DIAMETER, in the conic sections, is the axis, or a diameter parallel to a tangent to the curve at the vertex of another axis, or diameter, to which that is a conjugate. Indeed the two are mutually conjugates to each other, and each is parallel to the tangent at the vertex of the other.

CONJUGATE HYPERBOLAS, also called ADJACENT HYPERBOLAS, are such as have the same axes, but in the contrary order, the first or principal axis of the one being the second axis of the other, and the second axis of the former, the first axis of the latter.

CONJUGATE LEAF. (*folium conjugatum*). In botany. A pinnate leaf which has only one pair of leaflets. Conjugate raceme: having two racemes only, united by a common peduncle.

CONJUGA'TION. *s.* (*conjugatio*, Latin.) 1. A couple; a pair (*Brown*). 2. The act of uniting or compiling things together (*Bentley*). 3. Union; assemblage (*Taylor*).

CONJUGATION, in grammar, a regular distribution of the several inflexions of verbs in

their different voices, moods, tenses, numbers, and persons, so as to distinguish them from one another.

The Latins have four conjugations, distinguished by the terminations of the infinitive āre, ēre, ĕre, and īre; the vowels before *re* of the infinitive in the first, second, and fourth conjugations, being long vowels, and that before *re* in the infinitive of the third being a short one. See VOWEL.

The English have scarcely any natural inflexions, deriving all their variations from additional particles, pronouns, &c. whence there is scarcely any such thing as strict conjugation in that language.

CONIUM. Hemlock. In botany, a genus of the class pentandria, order digynia. Partial involucres halved, generally three-leaved; fruit ovate, gibbous, five-ribbed each side; the ribs curled before maturity; petals equal. Four species; three of the Cape; one common to the ditches of our own country. Of these the chief are,

1. C. Africanum: named in some herbals caucalis, with muricate seeds; smooth petioles and peduncles; leaflets not channelled. An herbaceous Cape plant reaching about nine inches in height, with umbels of white flowers.

2. C. maculatum. Common hemlock, with unarmed striate seeds; stem much branched, shining, spotted. It rises from a long, taper, parsnip-like root, to the height of about six feet, the stalks terminated by umbels of white flowers. In the pharmacopœias it is still more generally known under its officinal name of cicuta, and hence for its medical virtues see CICUTA.

CONJU′NCT. *a.* (*conjunctus*, Lat.) Conjoined; concurrent; united (*Shakspeare*).

CONJU′NCTION. *s.* (*conjunctio*, Latin.) 1. Union; association; league (*Bacon*).

CONJUNCTION, in astronomy, the meeting of two or more stars or planets in the same degree of the zodiac.

Conjunction may be considered as either *true* or *apparent*. When the two bodies meet in the same point of both longitude and latitude, the conjunction is *true*: when they agree in longitude, but differ in latitude, the conjunction is *apparent*.

Conjunction is either *heliocentric* or *geocentric*. *Heliocentric* conjunction is that which would appear to an observer at the sun: *geocentric*, that which would appear to one upon the earth.

Geocentric conjunctions are either *superior* or *inferior*: thus, when a planet is seen on the same circle of latitude with the sun but beyond him, the conjunction is called *superior*; when the planet is seen between the earth and sun, the conjunction is *inferior*.

Grand Conjunctions, are those wherein several of the planets are seen near together. M. de la Lande informs us, that on May 22d, 1702, Jupiter and Saturn were within 1° 4′ of each other: on February 11, 1524, Venus, Mars, Jupiter, and Saturn, were very near each other, and Mercury not above 16° from them: on November 11, 1544, Mercury, Venus, Jupiter, and Saturn, were within the space of 10°: on March 17, 1725, Mercury, Venus, Mars, and Jupiter, were so near each other, as to be all seen through the same telescope without changing its position: on December 23, 1769, Venus, Mars, and Jupiter, were within 1° of each other. The conjunctions of the planets among themselves, says this veteran astronomer, are sometimes attended to by the public, especially when connected with other events. Thus Messier has thought it worth his while to remark that the cannon announced the happy return of peace on the 3d of October, 1801, when the Moon, Venus, Jupiter, and Saturn, were near the beautiful star in the Lion's heart. We are no longer under the influence of opinions which attach to this kind of circumstances any importance; but in the year 1186, astronomers foretold terrible revolutions in consequence of the conjunction of all the planets. M. Haugergues has found by calculation, that on the 15th of September, 1186, at two minutes after 5, all the planets were between six signs, and six signs and ten degrees of longitude. (History of Astron. for 1801.)

CONJUNCTION, in grammar, an indeclinable word or particle, which serves to join words and sentences together, and thereby shews their relation or dependence upon one another. See GRAMMAR.

CONJUNCTIVE. *a.* (*conjunctivus*, Lat.) 1. Closely united: not in use (*Shakspeare*). 2. (In grammar.) The mood of a verb, used subsequently to a conjunction.

CONJUNCTIVE MEMBRANE. In anatomy. Membrana conjunctiva. The thin, transparent, delicate membrane that lines the internal superficies of one eyelid, and is reflected from thence, over the anterior part of the bulb, to the tarsus of the other eyelid. That portion which covers the transparent cornea cannot, without great difficulty, be separated from it. Inflammation of this membrane is called ophthalmia.

CONJU′NCTIVELY. *ad.* In union (*Br.*).

CONJU′NCTIVENESS. *s.* (from *conjunctive.*) The quality of joining or uniting.

CONJU′NCTLY. *ad.* (from *conjunct.*) Jointly; together; not apart.

CONJU′NCTURE. *s.* (*conjuncture*, Fr.) 1. Combination of many circumstances (*K. Charles*). 2. Occasion; critical time (*Clar.*). 3. Mode of union; connexion (*Holder*). 4. Consistency (*K. Charles*).

CONJURA′TION. *s.* (from *conjure.*) 1. The form or act of summoning another in some sacred name (*Shakspeare*). 2. An incantation; an enchantment (*Sidney*).

CONJURATION. To use conjuration, witchcraft, &c. was made felony by the 1st Jac. I. c. 12.; but that superstitious statute having produced many pernicious effects, it was wisely repealed by the 9th Geo. II. c. 5., wherein it is enacted, that no prosecution, suit, or proceeding, shall be commenced or carried on against any person for witchcraft, sorcery, enchantment, or conjuration, or for charging

another with any such offence, in any court whatsoever. But by the same statute, if any person shall pretend to exercise or use any kind of witchcraft, sorcery, enchantment, or conjuration, or undertake to tell fortunes, or pretend from his skill or knowledge in any occult or crafty science to discover where or in what manner any goods or chattels supposed to have been stolen or lost may be found; every person so offending, being convicted on indictment or information, shall suffer imprisonment for a year without bail or mainprize; and once in each quarter of the year, in some market-town of the proper county upon the market-day there, stand openly on the pillory for one hour; and shall also (if the court by which such judgment shall be given shall think fit) be obliged to give sureties for his good behaviour, in such sum and for such time as the court shall judge proper, according to the circumstances of the offence; and in such case shall be further imprisoned till such sureties shall be given. 4 Black. 60.

To CONJU'RE. *v. a.* (*conjuro*, Latin.) 1. To summon in a sacred name (*Clarendon*). 2. To bind many by an oath to some common design (*Milton*). 3. To influence by magick; to charm: pronounced *cónjure* (*K. Charles*).

To Co'njure. *v. n.* To practise charms or enchantments; to enchant (*Shakspeare*).

CO'NJURER. *s.* (from *conjure.*) 1. An enchanter (*Donne*). 2. An impostor who pretends to secret arts; a cunning man (*Prior*). 3. A man of shrewd conjecture (*Addison*).

CONJU'REMENT. *s.* (from *conjure.*) Serious injunction; solemn demand (*Milton*).

CONNARUS. Ceylon sumach. In botany, a genus of the class monadelphia, order decandria. Calyx five-parted; petals five; style one; capsule two-valved, one-celled, one-seeded. Seven species; natives of Asia and Africa.

CONNA'SCENCE. *s.* (*con* and *nascor*, Lat.) 1. Common birth; community of birth. 2. The act of uniting or growing together.

CONNA'TE. *a.* (from *con* and *natus*, Lat.) Born with another (*South*).

Connate leaf. (*folium connatum*). In botany. When two opposite leaves are so united at their bases as to have the appearance of one leaf; as in the garden honeysuckle. This term is applied also to filaments and anthers, united into one body; as in the classes monadelphia and syngenesia.

CONNA'TURAL. *a.* (*con* and *natural.*) 1. United with the being; connected by nature (*Davies*). 2. Participant of the same nature (*Milton*).

CONNATURA'LITY. *s.* (from *connatural.*) Participation of the same nature (*Hale*).

CONNA'TURALLY. *ad.* (from *connatural.*) By the act of nature; originally (*Hale*).

CONNA'TURALNESS. *s.* (from *connatural.*) Participation of the same nature; natural union (*Hale*).

CONNAUGHT, one of the four provinces of Ireland, having Munster on the S. and E. Ulster and part of the ocean on the N. and N.W. Leinster on the E. and the Atlantic ocean on the W. It is about 130 miles long, and 84 broad. It contains one archbishopric, 5 bishoprics, 6 counties, 7 market towns, 10 boroughs, and 330 parishes.

To CONNE'CT. *v. a* (*connecto*, Latin.) 1. To join; to link; to unite (*Boyle*). 2. To unite, as by a cement (*Locke*). 3. To join in a just series of thought: as, *the author* connects *his reasons well.*

To Conne'ct. *v. n.* To cohere; to have just relation to things precedent and subsequent.

CONNECTICUT, one of the five states of New-England in North America. It is 82 miles long and 57 broad, and is bounded on the N. by Massachusetts, on the E. by Rhode-Island, on the W. by New-York, and on the S. by the Sound, which divides it from Long Island. Though subject to the extremes of heat and cold in their seasons, and to frequent sudden changes, this country is very healthful. It is the most populous, in proportion to its extent, of any of the United States. Its principal rivers are the Connecticut, the Housatonik, the Thames, and their respective branches. It contains the counties of Hartford, New-Haven, New London, Fairfield, Windham, Litchfield, Middlesex, and Tolland. In 1790 its inhabitants amounted to 237,946.

CONNE'CTIVELY. *ad.* (from *connect.*) In conjunction; in union; jointly.

To CONNE'X. *v. a.* (*connexum*, Lat.) To join or link together (*Philips*).

CONNE'XION. *s.* (from *connex.*) 1. Union; junction (*Atterbury*). 2. Just relation to something precedent or subsequent; coherence (*Blackmore*).

Connexion of bones. See Anatomy and Articulation.

CONNEXIONS, a game at cards played by either three or four persons. If the former number, ten cards each are to be dealt; if the latter only eight each, which are dealt in the same manner as at whist, and bear the same import, excepting that diamonds are here always trumps.

The connexions are formed as follows:

1st by the two black aces.

2d —— ace of spades and king of hearts.

3d ———— clubs and king of hearts.

For the first connexion two shillings are drawn from the pool; for the second, one: and for the third and the winner of the majority sixpence each. These sums are supposing guineas staked; but when only silver is pooled, only pence are drawn.

A trump played in any round where there is a connexion wins the trice, otherwise it is gained by the player of the first card of connexion, and after a connexion any following player may trump without incurring a revoke, and also whatsoever suit may be led, the person holding a card of connexion is at liberty to play the same, but the others must, if possible, follow suit, unless one of them can answer the connexion, which should be done in preference.

No money can be drawn till the hands are finished, then the possessors of the connexions are to take first according to precedence, and those having the majority of tricks take last.

CONNE'XIVE. *a.* (from *connex.*) Having the force of connexion; conjunctive (*Watts*).

CONNICTA'TION. *s.* (from *connicto*, Latin.) A winking.

CONNI'VANCE. *s.* (from *connive.*) 1. The act of winking: not in use. 2. Voluntary blindness; pretended ignorance; forebearance (*South*).

To CONNI'VE. *v. n.* (*conniveo*, Lat.) 1. To wink (*Spectator*). 2. To pretend blindness or ignorance; to forbear; to pass uncensured (*Rogers*).

CONNIVENT. In botany, converging; applied either to the corol or the anthers.

CONNOISSEUR, a French term much used, of late, among us: it literally denotes a person well versed in any thing; being formed of the verb *connoitre*, to know, to understand. Hence it comes to be used in our language for a critic, or thorough judge, especially in matters of painting and sculpture.

CONNOR, a town of Ireland, in the county of Antrim, with a bishop's see. Lat. 54. 59 N. Lon. 6. 6 E.

To CO'NNOTATE. *v. a.* (*con* and *nota*, Latin.) To designate something beside itself; to imply; to infer (*Hammond*).

CONNOTA'TION. *s.* (from *connotate.*) Implication of something beside itself (*Hale*).

To CONNO'TE. *v. a.* (*con* and *nota*, Lat.) To imply; to betoken; to include (*South*).

CONNU'BIAL. *a.* (*connubialis*, Lat.) Matrimonial; nuptial; conjugal (*Pope*).

CONO, in commerce, a Florence wine measure of 10 barrels, each barrel being about 12 gallons.

CONOBEA. In botany, a genus of the class didynamia, order angiospermia. Calyx five-cleft; corol two-lipped; capsule one-celled; four-valved, many-seeded. One species only: an herbaceous, creeping plant of Guiana, with axillary one-flowered peduncles; the colour of the flowers blue.

CONOCARPUS. Button-tree. A genus of the class pentandria, order monogynia. Corol with five petals or none: calyx campanulate; seeds naked, solitary, inferior; flowers mostly aggregate. Three species; natives of the West Indies. One a shrub procumbent, with roundish leaves, without petals. The other two tall trees one with alternate and one with opposite leaves, this last is called by the Caribbees white-mangrove.

CONOID, is a figure resembling a cone, except that the slant sides from the base to the vertex are not straight lines as in the cone, but curved. It is generated by the revolution of a conic section about its axis; and it is therefore threefold, answering to the three sections of the cone, viz. the *Elliptical Conoid*, or spheroid, the *Hyperbolic Conoid*, and the *Parabolic Conoid.*

If a conoid be cut by a plane in any position, the section will be of the figure of some one of the conic sections; and all parallel sections, of the same conoid, are like and similar figures. When the section of the solid returns into itself, it is an ellipse; which is always the case in the sections of the spheroid, except when it is perpendicular to the axis; which position is also to be excepted in the other solids, the section being always a circle in that position. In the parabolic conoid, the section is always an ellipse, except when it is parallel to the axis. And in the hyperbolic conoid, the section is an ellipse, when its axis makes with the axis of the solid, an angle greater than that made by the said axe of the solid and the asymptote of the generating hyperbola; the section being an hyperbola in all other cases, but when those angles are equal, and then it is a parabola.

But when the section is parallel to the fixed axis, it is of the same kind with, and similar to the generating plane itself; that is, the section parallel to the axis, in the spheroid, is an ellipse similar to the generating ellipse; in the parabolic conoid it is a parabola, similar to the generating one; and in the hyperbolic conoid, it is an hyperbola similar to the generating one.

The section through the axis, which is the generating plane, is in the spheroid the greatest of the parallel sections, but in the hyperboloid it is the least, and in the paraboloid those parallel sections are all equal.

The analogy of the sections of the hyperboloid to those of the cone, are very remarkable, all the three conic sections being formed by cutting an hyperboloid in the same positions as the cone is cut. Thus, let an hyperbola and its asymptote be revolved together about the transverse axis, the former describing an hyperboloid, and the latter a cone circumscribing it: then let it be supposed that they are both cut by one plane in any position; so shall the two sections be like, similar, and concentric figures: that is, if the plane cut both the sides of each, the sections will be concentric and similar ellipses; but if the cutting plane be parallel to the asymptote, or to the side of the cone, the sections will be parabolas; and in all other positions, the sections will be similar and concentric hyperbolas. (*Hutton's Math. Dict.*)

CONOI'DICAL. *a.* (from *conoid.*) Approaching to a conick form.

CONON, a famous general of Athens, son of Timotheus, was made governor of all the islands of the Athenians, and was defeated in a naval battle by Lysander, near the Ægosopotamos. He retired in voluntary banishment to Evagoras king of Cyprus, and afterwards to Artaxerxes king of Persia, by whose assistance he freed his country from slavery. He defeated the Spartans near Cnidos, in an engagement where Pisander, the enemy's admiral, was killed. By his means the Athenians fortified their city with a strong wall, and attempted to recover Ionia and Æolia. He was perfidiously betrayed by a Persian, and died in prison, B.C. 393. (*C. Nep.* &c.) 2. A Greek astronomer of Samos, who was intimate with Archimedes, and flourished 237 years B.C. (*Catull. Virg.*)

5. A Grecian mythologist, in the age of Julius Cæsar, who wrote a book which contained 40 fables, still extant.

CONOPEA. See CONOBEA.

CONOPEUM. (from κώνωψ, a fly.) A sort of net-work made by the ancients to keep away flies.

CONOPS. In zoology, a genus of the class insecta, order diptera. Mouth with a projecting, geniculate proboscis; antennas clavate and pointed at the end. These insects extract blood and other juices from animals. The genus comprises twenty-two species, thus conveniently bisected:

A. Sucker geniculate near the base, with a single valved, abbreviated sheath inclosing a single bristle.

B. Sucker geniculate at the base and middle, the sheath with two equal valves. The following are the two chief species:

1. C. macrocephala. Blue-black, four of the segments of the abdomen edged with yellow; thorax variegated. Found largely in the meadows of our own country and of Europe generally, and offering some resemblance to a wasp.

2. C. ferruginea. Ferruginous; abdomen cylindrical incurved; front yellowish. Inhabits Europe generally; and in the autumn troublesome to horses and other quadrupeds.

CONOSPERMUM. In botany, a genus of the class tetrandria, order monogynia. Calyxless; corol one-petalled, ringent, bearing the stamens; the upper lip vaulted lower, three cleft; stigma obtuse; seeds single, naked, crowned with down. One species only; a rigid Australasian shrub, with scattered leaves, and spiked flowers.

To CONQUA'SSATE. *v. a.* (*conquasso*, Lat.) To shake; to agitate: not in use (*Harv.*).

CONQUASSA'TION. *s.* (from *conquassate.*) Agitation; concussion.

To CO'NQUER. *v. a.* (*conquerir*, French.) 1. To gain by conquest; to win (*Pope*). 2. To overcome; to subdue (*Smith*). 3. To surmount; to overcome; as, *he conquered his reluctance.*

To CO'NQUER. *v. n.* To get the victory; to overcome (*Decay of Piety*).

CO'NQUERABLE. *a.* (from *conquer.*) Possible to be overcome (*South*).

CO'NQUEROR. *s.* (from *conquer.*) 1. A man that has obtained a victory; a victor (*Shakspeare*). 2. One that subdues and ruins countries (*Milton*).

CO'NQUEST. *s.* (*conqueste*, French.) 1. The act of conquering; subjection (*Davies*). 2. Acquisition by victory; thing gained. 3. Victory; success in arms (*Addison*).

CONSANGUI'NEOUS. *a.* (*consanguineus*, Latin.) Near of kin; of the same blood; related by birth, not affined (*Shakspeare*).

CONSANGUINITY, the relation subsisting between persons of the same blood, or who are sprung from the same root.

Consanguinity terminates in the sixth and seventh degree, except in the succession of the crown, in which case it is continued to infinity. Marriage is prohibited by the church to the fourth degree of consanguinity inclusive; but by the law of nature, consanguinity is no obstacle to marriage, except in the direct line.

The civilians call *fratres consanguinei*, those born of the same father, in opposition to *fratres uterini*, who are only born of the same mother. It is the common opinion that the former was not allowed to complain of an inofficious testament, that is, of being disinherited without cause, except from the turpitude of the person appointed heir in their place.

CONSARCINA'TION. *s.* (from *consarcino*, Latin.) The act of patching together.

CO'NSCIENCE. *s.* (*conscientia*, Latin.) 1. The faculty by which we judge of the goodness or wickedness of ourselves (*Spenser*). 2. Justice; the estimate of conscience (*Swift*). 3. Consciousness; knowledge of our own thoughts or actions (*Hooker*). 4. Real sentiment; private thoughts (*Clarendon*). 5. Scruple; principle of action (*Taylor*). 6. Reason; reasonableness (*Swift*).

We must beware how we confound the terms *consciousness* and *conscience*; for though in a lax sense one may sometimes be used for the other, and though the Latin include them both in the word *conscientia*; yet there is a great deal of difference between them in strict language. *Consciousness* is confined to the actions of the mind, being nothing else than that knowledge of itself, which is inseparable from every thought and voluntary motion of the soul. *Conscience* extends to *all* our actions bodily as well as mental. *Consciousness* is the knowledge of the *existence, conscience* of the *moral nature* of actions. *Consciousness* is the province of metaphysics, *conscience* of morality. *Conscience*, as defined by Mr. Grove, "is a man's reason or understanding, considered in the relations it bears to his actions, in their moral nature, and most important consequences." Or it is a secret testimony or judgment of the soul whereby it gives its approbation to things it does that are naturally good, and reproaches itself for those that are evil. As the objects of conscience are human actions considered in their moral nature, by which it is distinguished from common or worldly *prudence*, which looks not to the *internal* beauty or turpitude of actions, but to their influence on the quiet and happiness of this life, and the welfare of society. Conscience, says Mr. Grove, has a double respect; one of them more immediately to those practical principles by which it guides its judgment of all actions, the other to actions themselves. In the former respect it is called *synteresis*, the repository of moral principles and rules, a kind of jurisprudence or guardian, and interpreter of the law. In relation to actions themselves, if they are not yet done, it is a *preceptor* or *monitor*, commands the doing or forbearance of the action, persuades to it, if good, and dissuades from it, if evil. If they are *done*, it is a *witness*, which may be expressed by *syncidesis*, a knowledge of the fact; a *judge* whose acts are comprehended in the term *crisis*, pronouncing the action to

be well or ill done, conformable to law, or the contrary, and a *rewarder*, filling a man with satisfaction and hope when he has discharged his duty; with remorse, and shame, and fear, after he hath done what he ought not. Moral Philos. vol. ii. p. 10.

CONSCIE'NTIOUS. *a.* (from *conscience.*) Scrupulous; exactly just (*L'Estrange*).

CONSCIE'NTIOUSLY. *ad.* According to the direction of conscience (*L'Estrange*).

CONSCIE'NTIOUSNESS. *s.* (from *conscientious.*) Exactness of justice; tenderness of conscience (*Locke*).

CO'NSCIONABLE. *a.* (from *conscience.*) Reasonable; just (*Shakspeare*).

CO'NSCIONABLENESS. *s.* (from *conscionable.*) Equity; reasonableness.

CO'NSCIONABLY. *ad.* (from *conscionable.*) Reasonably; justly (*Taylor*).

CO'NSCIOUS. *a.* (*conscius*, Latin.) 1. Endowed with the power of knowing one's own thoughts and actions (*Bentley*). 2. Knowing from memory (*Dryden*). 3. Admitted to the knowledge of any thing (*Bentley*). 4. Bearing witness by the dictate of conscience to any thing (*Clarendon*).

CO'NSCIOUSLY. *ad.* With knowledge of one's own actions.

CO'NSCIOUSNESS. *s.* (from *conscious.*) 1. The perception of what passes in a man's own mind (*Watts*). 2. Internal sense of guilt, or innocence (*Pope*). See CONSCIENCE.

CONSCRIPT, in Roman antiquity, an appellation given to the senators of Rome, who were called conscript fathers, on account of their names being all entered in one register.

CONSCRIPTS, also denote men raised to recruit the Imperial and French armies.

CONSCRI'PTION. *s.* (*conscriptio*, Latin.) An enrolling or registering.

To CO'NSECRATE. *v. a.* (*consecro*, Lat.) 1. To make sacred; to appropriate to sacred uses (*Hebrews*). 2. To dedicate inviolably to some particular purpose, or person (*Numbers*). 3. To canonize.

CO'NSECRATE. *a.* Consecrated; sacred; devoted; dedicated (*Drayton*).

CO'NSECRATER. *s.* (from *consecrate.*) One that performs the rites by which any thing is devoted to sacred purposes (*Atterbury*).

CONSECRATION, the act of devoting any thing to the service and worship of God. The Mosaical law ordained, that all the first-born, both of man and beast, should be sanctified or consecrated to God. We find also, that Joshua consecrated the Gibeonites, as Solomon and David did the Nethinims, to the service of the temple; and that the Hebrews sometimes consecrated their fields and cattle to the Lord, after which they were no longer in their power. Among the ancient Christians, the consecration of churches was performed with a great deal of pious solemnity. The Romanists have a great deal of foppery in the ceremonies of consecration; which they bestow on almost every thing, as bells, candles, books, water, oil, ashes, palms, swords, banners, pictures, crosses, agnus dei's, roses, children's clouts, &c. In England churches have been always consecrated with particular ceremonies, the form of which was left to the discretion of the bishop. That observed by bishop Laud, in consecrating St. Catherine Creed church, in London, gave great offence. See Towgood's Letters, and Laud's Trial.

CONSECRATION is particularly used for the benediction of the elements in the eucharist.

CONSECRATION, among medalists, is the ceremony of the apotheosis of an emperor, or his translation into heaven and reception among the gods. On medals the consecration is often thus represented: on one side is the emperor's head, crowned with laurel, sometimes veiled; and the inscription gives him the title of *divus*: and on the reverse is a temple, a bustum, an altar, or an eagle taking its flight towards heaven, either from off the altar, or from a cippus.

CO'NSECTARY. *a.* (from *consectarius*, Lat.) Consequent; consequential (*Brown*).

CO'NSECTARY. *s.* Deduction from premises; consequence; corollary (*Woodward*).

CONSECU'TION. *s.* (*consecutio*, Latin.) 1. Train of consequences; chain of deductions (*Hale*). 2. Succession (*Newton*). 3. (In astronomy.) The month of *consecution*, is the space between one conjunction of the moon with the sun unto another (*Brown*).

CONSECUTION, in the composition of music, is when two or more similar intervals, or distances from the moving bass, follow each other; either in one part, as the tenor relatively to the bass, or more. Suppose, to the bass in C, is set the tenor in C, and the counter-tenor in E; the next note of the bass being D, the tenor B, and counter-tenor D: here there is a consecution of octaves between the upper parts and the bass, which, according to some authors, is not to be allowed, neither is the consecutions of fifths allowable: but that of major thirds and minor sixths is allowed. It is now most common to restrain the acceptation and rules of consecution to each separate part as compared with the bass.

CONSE'CUTIVE. *a.* (*consecutif*, Fr.) 1. Following in train; successive (*Arbuthnot*). 2. Consequential; regularly succeeding (*Locke*).

To CONSE'MINATE. *v. a.* (*consemino*, Latin.) To sow different seeds together.

CONSE'NSION. *s.* (*consensio*, Lat.) Agreement; accord (*Bentley*).

CONSE'NT. *s.* (*consensus*, Latin.) 1. The act of yielding or consenting (*K. Charles*). 2. Concord; agreement; accord (*Cowley*). 3. Coherence with; correspondence (*Milton*). 4. Joint operation (*Pope*).

To CONSE'NT. *v. n.* (*consentio*, Latin.) 1. To be of the same mind; to agree (*Milton*). 2. To co-operate to the same end. 3. To yield; to allow; to admit (*Genesis*).

CONSENT OF PARTS. In physiology, the same as sympathy. See SYMPATHY.

CONSENTA'NEOUS. *a.* (*consentaneus*, Lat.) Agreeable to; consistent with (*Ham.*).

CONSENTA'NEOUSLY. *ad.* Agreeably; consistently; suitably (*Boyle*).

CONSENTA'NEOUSNESS. *s.* (from *consentaneous.*) Agreement; consistence.

CONSENTES, the name which the Romans gave to the *Dii majorum gentium*. The word signifies *consentientes*, that is, consenting to the deliberations of Jupiter's council.

CONSE'NTIENT. *a.* (*consentiens*, Latin.) Agreeing; united in opinion.

CO'NSEQUENCE. *s.* (*consequentia*, Lat.) 1. That which follows from any cause or principle. 2. Event; effect of a cause (*Milton*). 3. Deduction; conclusion (*Decay of Piety*). 4. The last proposition of a syllogism (*Prior*). 5. Concatenation of causes and effects (*South*). 6. Influence; tendency (*Hammond*). 7. Importance; moment (*Swift*).

CO'NSEQUENT. *a.* (*consequens*, Latin.) 1. Following by rational deduction. 2. Following as the effect of a cause (*Locke*).

CO'NSEQUENT. *s.* 1. Consequence; that which follows from previous propositions (*Hooker*). 2. Effect; that which follows an acting cause (*Davies*).

CONSEQUENT OF A RATIO, the latter of the two terms of a ratio; or that to which the antecedent is referred.

CONSEQUENTIA, in astronomy, is opposed to antecedentia; and a motion in consequentia is a motion in the order of the signs of the zodiac.

CONSEQUE'NTIAL. *a.* (from *consequent.*) 1. Produced by the necessary concatenation of effects or causes (*Prior*). 2. Conclusive (*Hale*).

CONSEQUE'NTIALLY. *ad.* 1. With just deduction of consequences; with right connexion of ideas (*Addison*). 2. By consequence; eventually (*Smith*). 3. In a regular series (*Ad.*).

CONSEQUE'NTIALNESS. *s.* (from *consequential.*) Regular consecution of discourse.

CO'NSEQUENTLY. *ad.* (from *consequent.*) 1. By consequence; necessarily (*Woodward*). 2. In consequence; pursuantly (*South*).

CO'NSEQUENTNESS. *s.* (from *consequent.*) Regular connexion of propositions (*Digby*).

CONSERVA. (*conserva*, from *conservo*, to keep). In medicine, a conserve. A composition of some recent vegetable and sugar, beat together into an uniform mass of the consistence of honey; as conserve of hips, orange peel, &c.

CONSERVA ABSINTHII MARITIMI. For its virtues, see ABSINTHUM MARITIMUM.

CONSERVA ARI. This is occasionally exhibited as a stimulant and diuretic.

CONSERVA AURANTII HISPALENSIS. This is well calculated to form the basis of a tonic and stomachic conserve, and may be given alone, as possessing such qualities.

CONSERVA CYNOSBATI. Conserve of hips: is cooling and adstringent; it is seldom given alone, but mostly joined to some other medicine in the form of linctus or electuary.

CONSERVA LUJULÆ. This preparation of wood sorrel possesses sub-acid, cooling, and antiseptic qualities.

CONSERVA MENTHÆ. This preparation of mint is given, occasionally, as a stomachic in sickness and weakness of the stomach.

CONSERVA PRUNI SYLVESTRIS. Astringent virtues are ascribed to this medicine, which is now seldom used but amongst private formulæ.

CONSERVA ROSÆ. This composition affords a very excellent way of exhibiting roses; rubbed down with water it forms an excellent drink, with some lemon juice, in hæmorrhagic complaints; it may also be given with vitriolated zinc in form of an electuary.

CONSERVA SCILLÆ. This preparation of squills affords an excellent basis for an electuary, possessing expectorant and diuretic qualities.

CONSE'RVABLE. *a.* (from *conservo*, Lat.) Capable of being kept.

CONSE'RVANCY. *s.* Courts held by the lord mayor of London for the preservation of the fishery on the river Thames are called *Courts of Conservancy*.

CONSERVA'TION. *s.* (*conservatio*, Lat.) 1. The act of preserving; continuance; protection (*Woodward*). 2. Preservation from corruption (*Bacon*).

CONSE'RVATIVE. *a.* (from *conservo*, Latin.) Having the power of opposing diminution or injury (*Peacham*).

CONSERVATOR, an officer ordained for the security and preservation of the privileges of some cities and communities, having a commission to judge of and determine the differences among them.

In most catholic universities there are two conservators: one of whom decides the differences between the regents, students, &c. and the other takes cognizance of spiritual matters between ecclesiastics: the former is called conservator of royal privileges, or those granted by kings; the latter is called the conservator of apostolical privileges, or those granted by the pope.

CONSERVATOR OF THE PEACE, in our ancient customs, a person who had a special charge to keep the king's peace. The chamberlain of Chester is still a conservator in that county; and petty constables are by the common law, conservators, &c. of the king's peace.

CONSERVATOR OF THE TRUCE AND SAFE-CONDUCTS, an officer formerly appointed by the king's letters patent, whose business it was to make enquiry of all offences committed against the king's truce and safe-conducts upon the main seas out of the liberties of the cinque-ports.

CONSERVATORIOS are musical schools established for the instruction of children in music. There are four of these at Venice, designed for the education of girls, and three at Naples for the instruction of boys.

CONSE'RVATORY. *s.* (from *conservo*, Latin.) A place where any thing is kept in a manner proper to its peculiar nature (*Wood.*).

CONSE'RVATORY. *a.* Having a preservative quality.

To CONSE'RVE. *v. a.* (*conservo*, Latin.) 1. To preserve without loss or detriment. 2. To candy or pickle fruit.

CONSE'RVE. *s.* (from the verb.) 1. A sweetmeat made of the inspissated juices of fruit (*Dennis*). 2. A conservatory; not usual (*Evelyn*). See CONSERVA.

CONSE'RVER. *s.* (from *conserve.*) 1. A layer up; a repositer (*Hayward*). 2. A preparer of conserves.

CONSE'SSION. *s.* (*consessio*, Latin.) A sitting together.

CONSE'SSOR. *s.* (Latin.) One that sits with others.

To CONSI'DER. *v. a.* (*considero*, Latin.) 1. To think upon with care; to ponder; to examine; to sift; to study (*Spectator*). 2. To take into the view; not to omit in the examination (*Temple*). 3. To have regard to; to respect (*Hebrews*). 4. To requite; to reward one for his trouble (*Shakspeare*).

To CONSI'DER. *v. n.* 1. To think maturely (*Isaiah*). 2. To deliberate; to work in the mind (*Swift*). 3. To doubt; to hesitate (*Sh.*).

CONSI'DERABLE. *a.* (from *consider.*) 1. Worthy of consideration; worthy of regard and attention (*Tillotson*). 2. Respectable; above neglect (*Sprat*). 3. Important; valuable (*Addison*). 4. More than little; a middle sense between little and great (*Clarendon*).

CONSI'DERABLENESS. *s.* (from *considerable.*) Importance; dignity; moment; value; desert; a claim to notice (*Boyle*).

CONSI'DERABLY. *ad.* (from *considerable.*) In a degree deserving notice (*Roscom.*). 2. With importance; importantly (*Pope*).

CONSI'DERANCE. *s.* (from *consider.*) Consideration; reflection (*Shakspeare*).

CONSI'DERATE. *a.* (*consideratus*, Lat.) 1. Serious; prudent; not rash (*Tillotson*). 2. Having respect to; regardful (*D. of Piety*). 3. Moderate; not rigorous.

CONSI'DERATELY. *ad.* (from *considerate.*) Calmly; coolly; prudently (*Bacon*).

CONSI'DERATENESS. *s.* (from *considerate.*) Prudence; calm deliberation.

CONSIDERA'TION. *s.* (from *consider.*) 1. The act of considering; mental view; regard; notice (*Locke*). 2. Mature thought; prudence (*Sidney*). 3. Contemplation; meditation (*Sidney*). 4. Importance; claim to notice; worthiness of regard (*Addison*). 5. Equivalent; compensation (*Ray*). 6. Motive of action; influence (*Clarendon*). 7. Reason; ground of concluding (*Hooker*).

CONSIDERATION, in law, the material cause or ground of a contract, without which the party contracting would not be bound. Consideration in contracts, is something given in exchange, something that is mutual and reciprocal; as money given for goods sold, work performed for wages. And a consideration of some sort or other is so absolutely necessary to the forming a contract, that a *nudum pactum*, or agreement to do or pay any thing on one side, without any compensation on the other, is totally void in law; and a man cannot be compelled to perform it. A consideration is necessary to create a debt.

CONSI'DERER. *s.* A man of reflection; a thinker (*Gov. of the Tongue*).

CONSI'DERING. (A kind of conjunction.) If allowance be made for (*Spectator*).

To CONSI'GN. *v. a.* (*consigno*, Latin.) 1. To give to another any thing in a formal way; to transfer (*South*). 2. To appropriate; to quit for a certain purpose (*Dryden*). 3. To commit; to entrust (*Addison*).

To CONSI'GN. *v. n.* 1. To yield; to submit: not in use (*Shakspeare*). 2. To sign; to consent to: obsolete (*Shakspeare*).

CONSIGNA'TION. *s.* (from *consign.*) 1. The act of consigning (*Taylor*). 2. The act of signing (*Taylor*).

CONSI'GNMENT. *s.* (from *consign.*) 1. The act of consigning. 2. The writing by which any thing is consigned.

CONSI'MILAR. *a.* (from *consimilis*, Lat.) Having one common resemblance.

To CONSI'ST. *v. a.* (*consisto*, Latin.) 1. To subsist; not to perish (*Colossians*). 2. To continue fixed, without dissipation (*Brerew.*). 3. To be comprised; to be contained (*Walsh*). 4. To be composed (*Burnet*). 5. To have been concurrently; to coexist (*Bramhall*). 6. To agree; not to oppose (*Clarendon*).

CONSI'STENCE. CONSI'STENCY. *s.* (*consistentia*, low Latin.) 1. State with respect to material existence (*Bacon*). 2. Degree of denseness or rarity (*Arbuthnot*). 3. Substance; form; make (*South*). 4. Durable or lasting state (*Locke*). 5. Agreement with itself, or with any other thing; congruity; uniformity (*Addison*). 6. A state in which things continue for some time at a stand (*Chambers*).

CONSI'STENT. *a.* (*consistens*, Latin.) 1. Not contradictory; not opposed (*South*). 2. Firm; not fluid (*Woodward*).

CONSI'STENTLY. *ad.* Without contradiction; agreeably (*Broome*).

CONSISTO'RIAL. *a.* (from *consistory.*) Relating to the ecclesiastical court (*Ayliffe.*)

CONSISTORY, (*consistorium*), signifies as much as *prætorium*, a tribunal: it is commonly used for a council-house of ecclesiastical persons, or place of justice in the spiritual court; a session or assembly of prelates. And every archbishop and bishop of every diocese hath a consistory court held before his chancellor or commissary in his cathedral church, or other convenient place of his diocese, for ecclesiastical causes. The bishop's chancellor is the judge of his court, supposed to be skilled in the civil and canon law; and in places of the diocese far remote from the bishop's consistory, the bishop appoints a commissary to judge in all causes within a certain district, and a register to enter his decrees, &c.

CONSISTORY, at Rome, denotes the college of cardinals, or the pope's senate and council, before whom judiciary causes are pleaded. Du Cange derives the word from *consistorium*; i.e. *locus ubi consistitur*; used chiefly for a vestibule, gallery, or anti-chamber, where the courtiers wait for admission; and called *à consistente multitudine*. The consistory is the first court, or tribunal of Rome; it never meets but when the pope pleases to convoke it: the pope presides in it in person, mounted on a

magnificent throne, and habited in his *pontificalia*; on the right are the cardinal bishops and priests, and on the left the cardinal-deacons. The place where it is held is a large hall in the apostolical palace, where princes and ambassadors of kings are received. The other prelates, prothonotories, auditors of the rota, and other officers, are seated on the steps of the throne: the courtiers sit on the ground; ambassadors on the right, and consistorial and fiscal advocates behind the cardinals. Besides the public consistory, there is also a private one, held in a retired chamber, called the *chamber of papegay*; the pope's throne here being only raised two steps high. Nobody is here admitted but the cardinals, whose opinions are collected, and called *sentences*. Here are first proposed and passed all bulls for bishoprics, abbeys, &c. Hence bishoprics and abbeys are said to be consistorial benefices; in regard they must be proposed in the consistory, the annates be paid to the pope, and his bulls taken. Anciently they were elective; but by the concordat, which abolishes elections, they are appointed to be collated by the pope alone, on the nomination of the prince.

Consistory was also the name of a court under Constantine, where he sat in person, and heard causes: the members of this court were called *comites*.

In England, the archbishop and bishop of every diocese has a consistory court, held before his chancellor or commissary in his cathedral church, or other convenient place in his diocese, for ecclesiastical causes. From the bishop's court the appeal is to the archbishop: from the archbishop's court to the delegates.

CONSO'CIATE. *s.* (from *consocio*, Lat.) An accomplice; a confederate; a partner (*Haytw.*).

To Conso'ciate. *v. a.* (*consocio*, Latin.) 1. To unite; to join (*Wotton*). 2. To cement; to hold together (*Burnet*).

To Conso'ciate. *v. n.* To coalesce; to unite (*Bentley*).

CONSOCIA'TION. *s.* (from *consociate.*) 1. Alliance (*Ben Jonson*). 2. Union; intimacy; companionship.

CONSO'LABLE. *a.* (from *console.*) That admits comfort.

To CO'NSOLATE. *v. a.* (*consolor*, Latin.) To comfort; to console (*Brown*).

CONSOLA'TION. *s.* (*consolatio*, Latin.) Comfort; alleviation of misery (*Bacon*).

CONSOLA'TOR. *s.* (Latin.) A comforter.

CONSO'LATORY. *s.* (from *consolate.*) A speech or writing containing topicks of comfort (*Milton*).

Conso'latory. *a.* (from *consolate.*) Tending to give comfort.

CONSOLE, in architecture, an ornament cut upon the key of an arch, which has a projecture; and, on occasion, serves to support little cornices, figures, busts, and vases.

To Conso'le. *v. a.* (*consolor*, Latin.) To comfort; to cheer (*Pope*).

CONSO'LER. *s.* (from *console.*) One that gives comfort (*Warburton*).

CONSOLIDA. (*consolida*, so called, quia consolidandi et conglutinandi di vi pollet; named from its power and use in agglutinating and joining together things broken). Comfrey. See Symphitum.

Consolida major. See Symphitum.

Consolida media. Bugula. Upright bugloss. Middle consound. This plant, ajuga pyramidalis, tetragono-pyramidalis, villosa, foliis radicalibus maximis, of Linnéus, possesses subadstringent and bitter qualities: and is recommended in phthisis, aphthæ, and cynanche. See Ajuga.

Consolida minor. See Prunella.

Consolida regalis. Calcatrippa. Many virtues are attributed to this plant, delphinium consolida; nectariis monophyllis, caule subdiviso, of Linnéus. The flowers are bitter, and a water distilled from them is recommended in ophthalmia. The herb is administered in calculous cases, obstructed menses, and visceral diseases.

Consolida saracenica. See Virga aurea, and Solidago.

CONSO'LIDANT. *a.* (from *consolidate.*) That has the quality of uniting wounds.

To CONSO'LIDATE. *v. a.* (*consolider*, French.) 1. To form into a compact or solid body; to harden (*Arbuthnot*). 2. To combine two parliamentary bills into one.

To Conso'lidate. *v. n.* To grow firm, hard, or solid (*Woodward*).

CONSOLIDA'TION. *s.* (from *consolidate.*) 1. The act of uniting into a solid mass. 2. The annexing of one bill in parliament to another. 3. The combining two benefices in one (*Cowley*).

CO'NSONANCE. Co'nsonancy. *s.* (*consonance*, French.) 1. Accord of sound (*Wott.*). 2. Consistency; congruence (*Ham.*). 3. Agreement; concord: not used (*Shaks.*).

Consonance, in music, a chord composed of sounds whose union or coalescence pleases the ear: and the sounds which form this chord are said to be consonant one with relation to the other. The reason of this denomination is, that a chord is found more perfect, as the sounds which form it coalesce more closely among themselves.

The octave of a sound is the most perfect of consonances of which that sound is susceptible; then the fifth, afterwards the third, &c. This is a fact founded on experiment. See Chord, and Concord.

CO'NSONANT. *a.* (*consonance*, French.) Agreeable; according; consistent (*Hooker*).

Consonant, a letter that cannot be sounded without some single or double vowel before or after it. Consonants are first divided into single and double; the double are *x* and *z*, the rest are all single: and these are again divided into mutes and liquids; eleven mutes, *b*, *c*, *d*, *f*, *v*, *g*, *j*, *k*, *p*, *q*, *t*; and four liquids, *l*, *m*, *n*, *r*. But the most natural division of consonants is that of the Hebrew grammarians, who have been imitated by the grammarians of other oriental languages. These divide the consonants into five classes, with regard to the five principal organs of the voice; which all

contribute, it is true, but one more notably than the rest, to certain modifications, which make five general kinds of consonants. „Each class comprehends several consonants, which result from the different degrees of the same modification, or from the different motions of the same organs: these organs are the throat, palate, tongue, teeth, lips; whence the five classes of consonants are denominated guttural, palatal, lingual, dental, and labial.

CO'NSONANTLY. *ad.* (from *consonant.*) Consistently; agreeably (*Tillotson*).

CO'NSONANTNESS. *s.* (from *consonant.*) Agreeableness; consistency.

CO'NSONOUS. *a.* (*consonus*, Lat.) Agreeing in sound; symphonious.

CONSOPIA'TION. *s.* (from *consopio*, Lat.) The act of laying to sleep (*Digby*).

CO'NSORT. *s.* (*consors*, Latin.) 1. Companion; partner (*Denham*). 2. An assembly; a divan; a consultation. 3. Concurrence; union (*Atterbury*).

To Conso'rt. *v. n.* (from the noun.) To associate with; to unite with (*Dryden*).

To Conso'rt. *v. a.* 1. To join; to mix; to marry (*Locke.*) 2. To accompany: not used (*Shakspeare*).

CONSO'RTABLE. *a.* (from *consort.*) To be compared with; suitable: not used (*Wotton*).

CONSO'RTION. *s.* (*consortio*, Lat.) Partnership; society.

CONSOUND. In botany. See Symphytum.

Consound (Lesser). See Bellis.

Consound (Middle). See Ajuga.

Consound (Royal). See Delphinium.

Consound (Saracen's). See Solidago and Senecio.

CONSPE'CTABLE. *a.* (from *conspectus*, Lat.) Easy to be seen.

CONSPECTU'ITY. *s.* (from *conspectus*, Lat.) Sense of seeing (*Shakspeare*).

CONSPE'RSION. *s.* (*conspersio*, Latin.) A sprinkling about.

CONSPICU'ITY. *s.* (from *conspicuous.*) Brightness; favourableness to the sight (*Glanville*).

CONSPI'CUOUS. *a.* (*conspicuus*, Latin.) 1. Obvious to the sight; seen at a distance. 2. Eminent; famous; distinguished (*Addison*).

CONSPI'CUOUSLY. *ad.* 1. Obviously to the view (*Watts*). 2. Eminently; famously; remarkably.

CONSPI'CUOUSNESS. *s.* (from *conspicuous.*) 1. Exposure to the view; state of being visible at a distance (*Boyle*). 2. Eminence; fame; celebrity (*Boyle*).

CONSPI'RACY. *s.* (*conspiratio*, Latin.) 1. A plot; a concerted treason (*Dryden*). 2. An agreement of men to do any thing evil or unlawful (*Cowell*). 3. A concurrence; a general tendency of many causes to one event (*Harvey*).

Conspiracy, in law, the unlawful confederation of any persons by oath or other covenant, that each of them shall aid and bear the other falsely and maliciously to indict or cause to be indicted, or falsely to move or maintain pleas. From which it seems clearly to follow, that not only those who actually cause an innocent man to be indicted, and also to be tried upon the indictment (whereupon he is lawfully acquitted), are properly conspirators; but that those also are guilty of this offence who basely conspire to indict a man falsely and maliciously, whether they do any act in prosecution of such confederacy or not. (1 Haw. 189.) For this offence the conspirators (for there must be at least two to form a conspiracy) may be indicted at the suit of the king, and may be sentenced to fine, imprisonment, and pillory. 4 Black. 136.

CONSPI'RANT. *a.* (*conspirans*, Latin.) Conspiring; engaged in a conspiracy; plotting (*Shakspeare*).

CONSPIRA'TION. *s.* (*conspiratio*, Lat.) An agreement of many to one end (*Decay of Piety*).

CONSPI'RATOR. *s.* (from *conspiro*, Lat.) A man engaged in a plot; a plotter (*South*).

To CONSPI'RE. *v. n.* (*conspiro*, Latin.) 1. To concert a crime; to plot (*Shakspeare*). 2. To agree together: as, *all things* conspire *to make him happy*.

CONSPI'RER. *s.* (from *conspire.*) A conspirator; a plotter (*Shakspeare*).

CONSPI'RING POWERS. (In mechanicks). All such as act in direction not opposite to one another (*Harris*).

CONSPURCA'TION. *s.* (from *conspurco*, Latin.) Defilement; pollution.

CONSTABLE. *Lord High Constable*, is an ancient officer of the crown, now disused in England, except on solemn occasions, as the king's coronation and the like; and also suppressed in France by Louis XIII. in 1627; though the office has been exercised in the command of the marshals, by the first officer in the army.

Some derive the word from the Saxon, and make it originally signify the stay, or hold, of the koning, or king: others, with more probability, derive it from *comes stabuli*, the master of the stables, or perhaps of the horse; and suppose that the dignity, which at first was civil, in time became military, and the master of the stables was made general of the army.

The function of the constable of England consisted in the care of the common peace of the land, in deeds of arms and matters of war. By a law of Richard II. the constable of England has the determination of things concerning wars and blazonry of arms, which cannot be discussed by the common law. The first constable was created by the Conqueror: the office continued hereditary till the thirteenth of Henry VIII. when it was laid aside, as being so powerful as to become troublesome to the king. We have also constables denominated from particular places, as constables of the Tower, of Dover-castle, of Windsor-castle, of the castle of Caernarvon, and many other of the castles of Wales.

From the lord high constable are derived those inferior ones, since called the constables

of hundreds or franchises, who were first ordained in the thirteenth of Edward I. by the statute of Winchester, which, for the conservation of peace and view of armour, appointed that two constables should be chosen in every hundred. These are what we now call high-constables, the increase of people and offences having made it necessary to appoint others under these, in every town, called petty-constables, who are of the like nature, though of inferior authority to the other. The high-constable over the whole hundred is usually chosen and sworn into his office by the justices of the peace, in their sessions: and as to petty-constables in towns, villages, &c. the right of choosing them belongs to the court-leet, though they may be elected by the parishioners. They are appointed yearly, and ought to be men of honesty, knowledge, and ability.

There are many persons exempted by law from serving the office of constable: these are the ancient officers of any of the colleges in the two universities, counsellors, attorneys, and all other officers whose attendance is required in the courts of Westminster-hall, aldermen of London, the president and fellows of the fellowship of physic in London, surgeons and apothecaries in London, and within seven miles thereof, being free of the company of apothecaries, and licensed teachers, or preachers in holy orders, in a congregation legally tolerated, shall be exempted from the office of a constable. The prosecutor of a felon to conviction, or the person to whom he shall assign the certificate thereof, shall be discharged from the office of constable.

To overrun the CONSTABLE. To spend more than what a man knows himself to be worth: a low phrase.

CO'NSTABLESHIP. *s.* (from *constable.*) The office of a constable (*Carew*).

CONSTANCE, a strong town of Suabia, in Germany, and the see of a bishop. It is rendered famous in history for a council which was held here in 1514, when there were three popes, all of whom were deposed, and Martin V. was elected in their room. The council caused Jerome of Prague to be burnt, though the emperor Sigismund had given him a safe conduct, in pursuance of the maxim, that no faith is to be kept with heretics. They also condemned the doctrines taught by Whitgift, and ordered his bones to be burnt, forty years after his death. But the inhabitants are Protestants at this time. It is 35 miles N.E. of Zurich. Lat. 47. 38 N. Lon. 9. 10 E.

CONSTANCE, a lake of Germany, between Suabia and Switzerland, 30 miles long, and 8 broad. The town of Constance above-mentioned is seated on its banks.

CO'NSTANCY. *s.* (*constantia*, Latin.) 1. Immutability; perpetuity; unalterable continuance (*Hooker*). 2. Consistency; unvaried state (*Ray*). 3. Resolution; firmness; steadiness (*Prior*). 4. Lasting affection (*South*). 5. Certainty; veracity; reality (*Shakspeare*).

CO'NSTANT. *a.* (*constans*, Latin.) 1. Firm; fixed; not fluid (*Boyle*). 2. Unvaried; unchanged; immutable (*Cowley*). 3. Firm; resolute; determined (*Shakspeare*). 4. Free from change of affection (*Sidney*). 5. Certain; not various; steady (*Addison*).

CONSTANT OF GIVEN QUANTITIES, are such as remain invariably the same, while others increase or decrease. Thus, the diameter of a circle is a constant quantity; for it remains the same while the abscisses and ordinates, or the sines, tangents, &c. are variable.

CONSTANTINA, a town of Spain, in Andalusia, fifty miles S.W. Cordova, and forty-two N.N.E. Seville.

CONSTANTINA, or COSTHINAH, a town of Africa, and capital of a province or district of Algiers, situated on the Rumnel, formerly called Cirta, and one of the strongest towns of Numidia: abundance of ruins give evidence of its ancient grandeur: twenty leagues E.S.E. Boujeia. Lon. 6. 15 E. Lat. 36. 50 N.

CONSTANTINE. See CONSTANTINUS.

CONSTANTINOPLE, anciently BYZANTIUM, is the capital of the empire of the Turks. It is situated on the European side of the Bosphorus, and was built on the ruins of the ancient Byzantium, by Constantine the Great. Its situation, in point of trade and prospect, is the finest in the world; and the antiquities it contains are scarcely to be paralleled. The city itself is twelve miles in circumference, and the suburbs are at least of equal dimensions. It is of a triangular figure, and contains between eight and nine hundred thousand inhabitants, who are Greeks, Armenians, Jews, and Turks. The seraglio is built upon the point of one of the angles, which runs out between the Propontis, or sea of Marmora, and the harbour. Below the palace, upon the declivity of the hill, are the gardens, on the spot where it is supposed Old Byzantium stood. Hence is a charming view of the delightful coast of Asia Minor, and the seraglio of Scutari. The mosque of St. Sophia, in this city, was once a Christian church, and is said, in many respects, to excel that of St. Peter's at Rome. Such was Constantinople; but on the 21st of August, 1782, a fire broke out in a quarter of the city, situated about the middle of the harbour, and burned without intermission for sixty-two hours, and with such fury, that it stopped only at the sea-side. It spread three miles in length, through one of the richest and best inhabited streets, so that 20,000 houses were destroyed, and near 200,000 inhabitants left destitute. Upwards of 50 mosques, 300 corn-mills, and 200 public ovens were destroyed. The grand signior, and all the ministers of the Porte, attended, as they usually do in any public calamity, in order, as far as possible, to alleviate the distress of the miserable sufferers. Since this time no expence has been spared to restore this part of the city to its pristine beauty. Another dreadful fire broke out in August, 1784, which consumed upwards of 10,000 houses. Constantinople is 700 miles S.E. of Vienna, 750 E. of Rome, 1500 S.E. of London, 1250 S.E. of

Paris, 1250 E. of Madrid, and 1100 S.S.E. of Stockholm. Lat. 41. 1 N. Lon. 28. 59 E.

CONSTANTINUS, CONSTANTINE, a name very common to the emperors of the East, the most celebrated of whom was he sirnamed the Great, from the greatness of his exploits. He was son of Constantius Chlorus, and Helena, daughter of Cool, king of the Roman district Colonia Camulodunum, including Colchester. He was born at Colchester about the year 274. A circumstance worth bearing in mind; since it thus appears that the first Christian emperor was by birth an Englishman. We shall here state only a few of his public acts. On the death of his father at York in 306, he was proclaimed emperor by the Roman army and by the English. He conquered Licinius his brother-in-law and colleague on the throne, and obliged him to lay aside the imperial power. It is said, that as he was going to fight against Maxentius, one of his rivals, he saw a cross in the sky, with this inscription, εν τουτω νικα, *in hoc vince.* From this circumstance he became a convert to Christianity, and obtained an easy victory, ever after adopting a cross or labarum as his standard. Constantine became sole emperor, and began to reform the state. He founded a city where Byzantium formerly stood, and called it by his own name, Constantinopolis. Thither he transported part of the Roman senate; and by keeping his court there, he made it the rival of Rome, in population and magnificence. From that time the two imperial cities began to look upon each other with an eye of envy; and soon after the age of Constantine, a separation was made of the two empires, and Rome was called the capital of the western, and Constantinopolis was called the capital of the eastern, dominions of Rome. The emperor has been distinguished for personal courage, and praised for the protection he extended to the Christians; but the murder of his son Crispus has been deservedly censured. Constantine was learned, and preached, as well as composed, many sermons, one of which remains. He died A. D. 337, after a reign of 31 years of the greatest glory and success. He left three sons, Constantinus, Constans, and Constantius, among whom he divided his empire.

CONSTANTIUS CHLORUS, son of Eutropius, and father of the great Constantine, merited the title of Cæsar, which he obtained by his victories in Britain and Germany. He became the colleague of Galerius, on the abdication of Dioclesian; and after bearing the character of a humane and benevolent prince, he died at York, and made his son his successor, A.D. 306.—2. The second son of Constantine the Great.—3. A Roman general of Nyssa, who married Placidia, the sister of Honorius, and was proclaimed emperor, an honour he enjoyed only seven months. He died, universally regretted, A. D. 421, and was succeeded by his son Valentinian in the west.

CO'NSTANTLY. *ad.* Unvariably; perpetually; certainly; steadily (*Tillotson*).

To CONSTE'LLATE. *v. n.* (*constellatus,* Latin.) To join lustre; to shine with one general light (*Boyle*).

To CONSTE'LLATE. *v. a.* To unite several shining bodies in one splendour (*Brown*).

CONSTELLATION, in astronomy, an assemblage or system of several stars, expressed and represented under the name and figure of some animal, or other thing: this assemblage is by some called also an asterism.

The ancients portioned out the firmament into several parts, or constellations; reducing a certain number of stars under the representation of certain images, in order to aid the imagination, and the memory, to conceive and retain their number, disposition, and even to distinguish the virtues which they attributed to them: in which sense a man is said to be born under a happy constellation, i. e. under a happy configuration of the heavenly bodies. The division of the heavens into constellations is very ancient; and, probably, as old as astronomy itself; at least, it was known to the most ancient authors extant, whether sacred or profane. In the book of Job, mention is made of the names of some of them; witness that sublime expostulation, "Canst thou restrain the sweet influence of the Pleiades, or loosen the bands of Orion?" And the same may be observed of the oldest among the heathen writers, Homer and Hesiod.

The ancients, in their division of the firmament, took in only so much as came under their notice, distributing it into forty-eight constellations; but the modern astronomers comprehend the whole starry firmament, dividing it into three regions. The names of the constellations are here given; and those which have been formed by the moderns are distinguished by an asterisk.—1. *Constellations in the Zodiac:* Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, Pisces.—2. *Constellations northward of the Zodiac:* Draco, Ursa major, Ursa minor, Perseus, Auriga, Bootes, Cepheus, *Canes Venatici, *Cor Caroli, Triangulum, *Triangulum minor, *Musca, *Lynx, *Leo minor, *Coma Berenices, *Camelopardalus, *Mons Menelaus, Corona Borealis, Serpens, *Scutum Sobieski, Hercules, Serpentarius, *Taurus Poniatowski, Lyra, *Vulpecula and Anser, Sagitta, Aquila, Cassiopeia, Delphinus, Cygnus, Equuleus, *Antinous, *Lacerta, Andromeda, and Pegasus. 3. *Constellations southward of the Zodiac:* Phœnix, *Officini sculptoria, Eridanus, Hydra, *Hydrus, Cetus, *Fornex chemica, *Horologium, *Reticulus Rhomboidalis, *Xiphias, *Celapraxitellis, Lepus, *Columba Noachi, Orion, Argo navis, Canis major, Canis minor, *Equuleus pictorius, *Monoceros, *Cameleon, *Pyxis nautica, *Piscis volans, *Sextans, *Robur Carolinum, *Machina pneumatica, Crater, Corvus, *Crux, *Musca indica, *Avis indica, *Circinus, Centaurus, Lupus, *Quadra Euclidis, Ara, *Triangulum australe, *Telescopium, Corona australis, *Pavo, *Grus, *Indus, *Microscopium, *Octans Hadleianus, *Toucan, Piscis australis,

*Mons mensæ, and *Nubeculæ major and minor.

Besides these, some astronomers on the continent have a few other constellations, as the Telescope of Herschel, the Harp of George, the Log-line, the Honour of Frederic, the Rein-deer, the Guardian of Harvests, the Quadrant, the Aerostadt (between the feet of Capricorn), and the Printing-press, east of Sirius. Some of these were proposed by Lalande, and other astronomers, at Gotha, in 1798.

Since the time of Bayer, it has been customary to mark the several stars in any constellation, by the letters of the Greek alphabet, then those of the Roman alphabet: as mentioned under CATALOGUE. But besides this, particular stars are named from their situation, as Cauda Cygni, Cor Leonis, &c. Others again have specific names peculiar to themselves, as Arcturus, Aldebaran, Sirius, Procyon, &c. In estimating the number of stars in any constellation, it is best to arrange them according to their magnitudes; and in the respective articles in this dictionary where we mention the stars in a constellation, we have followed this method. Thus, in BOOTES, for example, the figures 1. 0. 7. 10. 12. 24, denote that there are 1 star of the first magnitude, 0 of the second, 7 of the third, 10 of the fourth, 12 of the fifth, and 24 of the sixth.

The Greek and Roman poets, from the ancient theology, give wild and romantic fables about the origin of the constellations, probably derived from the hieroglyphics of the Egyptians, and transmitted, with some alterations, from them to the Greeks, who probably obscured them greatly with their own fables. See Hyginus's Poeticon Astron.; Riccioli Almagest. lib. 6. cap. 3, 4, 5; Shelburne's Notes upon Manilius; and Bailly's Ancient Astronomy: from the whole of which it is made probable, that the invention of the signs of the zodiac, and probably of most of the old constellations of the sphere, is to be ascribed to some very ancient nation, inhabiting the northern temperate zone, probably what is now called Tartary, or the parts to the northward of Persia and China; and from thence transmitted through China, India, Egypt, Greece, &c. to Europe. For a probable conjecture respecting the signs of the zodiac, see Hutton's Dict. art. Constellation.

CONSTERNA'TION. *s.* (from *consterno*, Lat.) Astonishment; amazement; wonder (*South*).

This is a species of fear, and is a strong foreboding of tremendous evils, which are likely to follow misfortunes that have already taken place. It may seize an individual, when surprised by the arrival of some dreadful disaster; or at the instant of his being made acquainted with the event: but it chiefly refers to alarms of a more extensive nature; to those excited by some general calamity, which threatens evils beyond the power of calculation. Earthquakes, volcanic eruptions, inundations, conflagrations, the sudden approach of an incensed and powerful enemy, are of this kind. Here the danger is widely diffused. Fear is rendered contagious, and by the influence of social sympathy, the consternation becomes universal, without having any particular tendency, or being directed to any particular object. When calamities of this nature arrive in a sudden and unexpected manner; particularly where the ideas of perfect security had been indulged, and perhaps were triumphant and insulting; surprise, wonder, astonishment, manifest their powers by the augmentation of misery; while a troubled imagination aggravates every possibility of horror. In all these cases the expressions of fear are wild and frantic. We should by a good conscience labour to fortify ourselves against such an amazing dread of the worst event that can befal us. Even an heathen poet could say, speaking of a man of integrity:

> "*Si fractus illabatur orbis,*
> *Impavidum ferient ruinæ.*"
> HORACE.

> "Should the whole frame of nature round him break,
> In ruin and confusion hurl'd;
> He unconcern'd could hear the mighty crack,
> And stand secure amidst a falling world."

To CO'NSTIPATE. *v. a.* (from *constipo*, Lat.) 1. To crowd together in a narrow room (*Ray*). 2. To stop by filling up the passages (*Arbuthnot*). 3. To bind the belly (*Brown*).

CONSTIPA'TION. *s.* (from *constipate.*) 1. The act of crowding any thing into less room; condensation (*Bentley*).

CONSTIPA'TION. (*constipatio*, from *constipo*, to crowd together.) Costiveness. A person is said to be costive when the alvine excretions are not expelled daily, and when the fæces are so hardened as not to receive their form from the impress of the rectum upon them.

CONSTI'TUENT. *a.* (*constituens*, Latin.) Elemental; essential; that of which any thing consists (*Dryden. Bentley*).

CONSTI'TUENT. *s.* 1. The person or thing which constitutes or settles any thing in its peculiar state (*Hale*). 2. That which is necessary to the subsistence of any thing (*Arbuthnot*). 3. He that deputes another.

To CO'NSTITUTE. *v. a.* (*constituo*, Lat.) 1. To give formal existence; to produce (*Decay of Piety*). 2. To erect; to establish (*Taylor*). 3. To depute; to appoint another to an office.

CO'NSTITUTER. *s.* (from *constitute.*) He that constitutes or appoints.

CONSTITU'TION. *s.* (from *constitute.*) 1. The act of constituting; enacting; deputing; establishing; producing. 2. State of being; natural qualities (*Newton*). 3. Corporeal frame (*Arbuthnot*). 4. Temper of body (*Dryden*). 5. Temper of mind (*Clarendon*). 6. Established form of government; system of laws and customs (*Daniel*). 7. Particular

law; established usage; establishment; institution (*Hooker*).

CONSTITUTION. In politics. Archdeacon Paley says, a constitution is so much of the laws of a country as mark the designation and form of its legislature, the rights and functions of the legislative body, and the nature and jurisdiction of the courts of justice; the constitution therefore is the principal section or title of the code of public laws, and the terms constitutional, and unconstitutional, signify in this case legal and illegal. The jurisprudence of England is composed of ancient usages, acts of parliament, and the decisions of the courts of law; those then are the sources whence the nature and limits of her constitution are to be deduced, and the authorities to which appeals must be made in all cases of doubt. An act of parliament can be considered unconstitutional only when it militates against other laws, which regulate the form of government.

By the combination of three species of government, monarchy, aristocracy, and democracy, in king, lords, and commons, the best properties of each are brought into effect, at the same time each branch operates as a check upon the encroachments of either. The principal excellence of this venerable fabric is, that every citizen may become a senator, and when such he possesses the right of proposing what laws he pleases to the legislature; and the right of taxation belonging to the commons, affords every reason for patiently acquiescing in their enactments, particularly as the national disbursements are annually laid before the public. The nature and degrees of punishment being fixed by laws, neither the monarch nor the magistrate can vary them, nor can a man be imprisoned falsely with impunity, through the operation of the habeas corpus act, or unjustly condemned when twelve impartial men of his own class decide upon his guilt or innocence. The power of framing laws vested in the two houses of parliament is restrained by the king's negative, and the abuse of that is prevented by their ability to refuse him supplies. In addition, all acts of the crown are illegal without the subscription of its great officers; besides which, parliament has the right of addressing the king, and punishing evil advisers. The appointment of obnoxious ministers may be resisted by the opposition of parliament to their measures, and the prerogative of declaring war may be checked by the refusal of money to carry it on, and by the same means no improper use can be made of the regular army. On this subject we would refer the reader to Custance's Concise View of the Constitution of England.

CONSTITUTIONS (Apostolical), a collection of regulations attributed to the apostles, and supposed to have been collected by St. Clement, whose name they likewise bear. It is the general opinion, however, that they are spurious, and that St. Clement had no hand in them. They appeared first in the fourth age, but have been much changed and corrupted since that time. They are divided into eight books, consisting of a great number of rules and precepts relating to the duties of Christians, and particularly the ceremonies and discipline of the church. Mr. Whiston, in opposition to the general opinion, asserts them to be a part of the sacred writings, dictated by the apostles in their meetings, and wrote down from their own mouth by St. Clement, and intended as a supplement to the New Testament, or rather as a system of Christian faith and polity. The reason why the constitutions are suspected by the orthodox, and, perhaps, the reason also why their genuineness is defended by Mr. Whiston, is, that they seem to favour Arianism.

CONSTITU'TIONAL. *a.* (from *constitution.*) 1. Bred in the constitution; radical (*Sharp*). 2. Consistent with the constitution; legal.

CO'NSTITUTIVE. *a.* (from *constitute.*) 1. Elemental; essential; productive (*Brown*). 2. Having the power to enact or establish.

To CONSTRA'IN. *v. a.* (*constraindre*, Fr.) 1. To compel; to force to some action (*Shakspeare*). 2. To hinder by force; to restrain (*Dryden*). 3. To necessitate (*Pope*). 4. To violate; to ravish (*Shakspeare*). 5. To confine; to press (*Gay*). 6. To constringe (*Dryden*). 7. To tie; to bind (*Dryden*).

CONSTRA'INABLE. *a.* (from *constrain.*) Liable to constraint (*Hooker*).

CONSTRA'INER. *s.* (from *constrain.*) He that constrains.

CONSTRA'INT. *s.* (*contrainte*, Fr.) Compulsion; violence; confinement (*Locke*).

To CONSTRI'CT. *v. a.* (*constrictum*, Lat.) 1. To bind; to cramp. 2. To contract; to cause to shrink (*Arbuthnot*).

CONSTRI'CTION. *s.* (from *constrict.*) Contraction; compression (*Ray*).

CONSTRI'CTOR. (*constrictor*, from *constringo*, to bind together.) A name given to each of those muscles which contract any opening of the body.

CONSTRI'CTOR ISTHMI FAUCIUM. Glosso-staphilinus of Winslow and Douglas. A muscle situated at the side of the entry of the fauces, that draws the velum pendulum palati towards the root of the tongue, which it raises at the same time, and with its fellow contracts the passage between the two arches, by which it shuts the opening of the fauces.

CONSTRI'CTOR ORIS. See ORBICULARIS ORIS.

CONSTRI'CTOR PHARY'NGIS INFERIOR. Crico-pharyngeus. Thyro-pharyngeus. A muscle situated on the posterior part of the pharynx. It arises from the side of the thyroid cartilage, near the attachment of the sterno hyoidæus and thyro-hyoidæus muscles; and from the cricoid cartilage, near the crico-thyroidæus; it is inserted into the white line, where it joins with its fellow, the superior fibres running obliquely upwards, covering nearly one-half of the middle constrictor, and terminating in a point; the inferior fibres run more transversely, and cover the beginning of the œsophagus. Its use is to compress that

part of the pharynx which it covers, and to raise it with the larynx a little upwards.

CONSTRI'CTOR PHARY'NGIS MEDIUS. Hyo-pharyngeus. Syndesmo-pharyngeus of Douglas. A muscle situated on the posterior part of the pharynx. It arises from the appendix of the os hyoides, from the corner of that bone, and from the ligament which connects it to the thyroid cartilage; the fibres of the superior part, running obliquely upwards, and covering a considerable part of the superior constrictor, terminate in a point; and is inserted into the middle of the cuneiform process of the os occipitis, before the foramen magnum, and joined to its fellow at a white line in the middle part of the pharynx. This muscle compresses that part of the pharynx which it covers, and draws it and the os hyoides upwards.

CONSTRI'CTOR PHARY'NGIS SUPE'RIOR. Cephalo-pharyngeus. Pterygo-pharyngeus. Mylo-pharyngeus. Glosso-pharyngeus. A muscle situated on the posterior part of the pharynx. It arises above from the cuneiform process of the os occipitis, before the foramen magnum, from the pterygoid process of the sphenoid bone, from the upper and under jaw, near the roots of the last dentes molares, and between the jaws. It is inserted in the middle of the pharynx. Its use is to compress the upper part of the pharynx, and to draw it forwards and upwards.

To CONSTRI'NGE. *v. a.* (*constringo*, Lat.) To compress; to contract; to bind (*Shakspeare*).

CONSTRI'NGENT. *a.* (*constringens*, Lat.) Having the quality of binding or compressing (*Bacon*).

To CONSTRU'CT. *v. a.* (*constructus*, Lat.) To build; to form; to compile (*Boyle*).

CONSTRU'CTION. *s.* (*constructio*, Lat.) 1. The act of building; fabrication. 2. The form of building; structure (*Arbuthnot*). 3. The putting of words together in such a manner as to convey a complete sense (*Locke*). 4. The act of arranging terms in the proper order, by disentangling transpositions (*Shakspeare*). 5. The sense; interpretation (*Collier*). 6. Judgment; mental representation (*Brown*). 7. The manner of describing a figure or problem in geometry.

CONSTRUCTION OF EQUATIONS, in algebra, is the finding the roots or unknown quantities of an equation, by geometrical construction of right lines or curves; or the reducing given equations into geometrical figures. And this is effected by lines or curves according to the order or rank of the equation.

The roots of any equation may be determined, that is, the equation may be constructed, by the intersections of a straight line with another line or curve of the same dimensions as the equation to be constructed: for the ordinates of the curve at the points of intersection will be the roots sought. Or, if instead of the right line, some other line of a higher order be used. Then, in general, an equation of any height will be constructed by the intersections of two lines, whose dimensions, multiplied together, produce the dimension of the given equation. Thus, the intersections of a circle with the conic sections, or of these with each other, will construct the biquadratic equations, or those of the 4th power, because $2 \times 2 = 4$; and the intersections of the circle or conic sections with a line of the third order, will construct the equations of the 5th and 6th power; and so on. For example,

To construct a Simple Equation.—This is done by resolving the given simple equation into a proportion, or finding a third or fourth proportional, &c. Thus, 1. If the equation be $ax = bc$; then $a : b :: c : x = \frac{bc}{a}$, the fourth proportional to a, b, c.

2. If $ax = b^2$; then $a : b :: b : x = \frac{b^2}{a}$, a third proportional to a and b.

3. If $ax = b^2 - c^2$; then, since $b^2 - c^2 = \overline{b+c} \times \overline{b-c}$, it will be $a : b+c :: b-c : x = \frac{\overline{b+c} \times \overline{b-c}}{a}$, a fourth proportional to a, $b+c$ and $b-c$.

4. If $ax = b^2 + c^2$; then construct the right angled triangle ABC, (fig. 7. Plate 48), whose base is b, and perpendicular c; the square of the hypothenuse is $b^2 + c^2$, which call h^2: then the equation is $ax = h^2$, and $x = \frac{h^2}{a}$, a third proportional to a and h.

To construct a Quadratic Equation.—If it be a simple quadratic, it will reduce to this form $x^2 = ab$: whence $a : x :: x : b$, or $x = \sqrt{ab}$, a mean proportional between a and b. Therefore, upon a straight line take AB $= a$ (fig. 6. Plate 48), and BC $= b$; then upon the diameter AC describe a semicircle, and raise from the point B a perpendicular to meet it in D: so shall BD be the root sought.

2. If the quadratic be affected, let it be $x^2 + 2ax = b^2$; then form the right angled triangle whose base AB is a (fig. 9. Plate 48), and perpendicular BC is b: with the centre A and radius AC, describe the semicircle DCE; then DB and BE will be the two roots of the given quadratic; x being $= \sqrt{b^2 + a^2} \pm a$.

3. If the quadratic be $x^2 - 2ax = b^2$, the construction will be the same as that of the preceding one, $x = a \pm \sqrt{b^2 + a^2}$, having one positive and one negative value.

4. But if the form be $x^2 - 2ax = -b^2$, or $2ax - x^2 = b^2$: construct a right angled triangle whose hypothenuse FG (fig. 8. Plate 48), is a, and perpendicular GH is b; with the radius FG and centre F, describe a semicircle IGK: then shall IH and HK be the roots of the given equation, x being $= a \pm \sqrt{a^2 - b^2}$. In this form, if a be greater than b, the equation will have two positive roots; but if a be less than b, the solution is manifestly impossible.

To construct Cubic and Biquadratic Equations.—Cubic equations are generally con-

structed by means of a conic section, and a right line; biquadratics, by the intersections of two conic sections. When one of the intersections falls upon the axis, then one of the ordinates vanishes, and the equation is reduced a degree lower. The conic sections used in constructing should be those which are most easily described: the circle and parabola are commonly chosen. It must be observed, though, that the chief or only use of these constructions, is in furnishing us with proper data to commence an approximation with.

For more on this subject, we refer to Simpson's, Maclaurin's, Newton's, Wolfius's, and Bossut's Algebra, L'Hospital's Conic Sections, Lacroix and Prony on the Application of Algebra to Geometry. See also EXPEDIENT.

CONSTRUCTION. In grammar. See GRAMMAR.

CONSTRUCTION. In fortification. See FORTIFICATION.

CONSTRU'CTURE. *s.* (from *construct.*) Pile; edifice; fabrick (*Blackmore*).

To CO'NSTRUE. *v. a.* (*construo*, Latin.) 1. To range words in their natural order; to disentangle transposition (*Shakspeare*). 2. To interpret; to explain (*Hooker*).

To CO'NSTUPRATE. *v. a.* (*constupro*, Lat.) To violate; to debauch; to defile.

CONSTUPRA'TION. *s.* (from *constuprate.*) Violation; defilement.

CONSUALIA, feasts held among the ancients, in honour of the god Consus, i. e. Neptune; different from those other feasts of the same deity called Neptunalia. They were introduced with a magnificent cavalcade, or procession on horseback; because Neptune was reputed to have first taught men the use of horses: whence his surname of Ἱππιος, Equestris.

CONSUBSTA'NTIAL. *a.* (*consubstantialis*, Lat.) 1. Having the same essence or substance (*Hooker*). 2. Being of the same kind or nature (*Brerewood*).

CONSUBSTANTIA'LITY. *s.* (from *consubstantial.*) Existence of more than one in the same substance (*Hammond*).

To CONSUBSTA'NTIATE. *v. a.* (*con* and *substantia*, Latin.) To unite in one common substance or nature.

CONSUBSTANTIATION, a tenet of the Lutheran church with regard to the manner of the change made in the bread and wine in the eucharist. The divines of that profession maintain that after the consecration, the body and blood of our Saviour are substantially present, together with the substance of the bread and wine, which is called consubstantiation, or impanation.

The best refutation of the notions of consubstantiation and transubstantiation, with which we are acquainted, are in Dr. Adam Clarke's learned little tract on the Nature and Design of the Eucharist.

CONSUL, the chief magistrate of the ancient Roman commonwealth, invested with regal authority for the space of one year. They were two in number, called consuls *à consulendo*, and annually chosen in the Campus Martius.

In the first times of the republic the two consuls were always chosen from patrician families or noblemen, but the people obtained the privilege in the year of Rome 388, of electing one of the consuls from their own body, and sometimes both were plebeians. The first consul among the plebeians was L. Sextius. It was required that every candidate for the consulship should be 43 years of age, called *legitimum tempus*. He was always to appear at the election as a private man without a retinue, and it was requisite before he canvassed for the office to have discharged the functions of quæstor, edile, and prætor. Sometimes these qualifications were disregarded. Val. Corvinus was made a consul in his 23d year, and Scipio in his 24th. Young Marius, Pompey, and Augustus, were also under the proper age when they were invested with the office, and Pompey had never been quæstor or prætor. The power of the consuls was unbounded, and they knew no superior but the gods and the laws; but after the expiration of their office their conduct was minutely scrutinized by the people, and misbehaviour was often punished by the laws. The badge of their office was the prætexta, a robe fringed with purple, afterwards exchanged for the toga picta or palmata. They were preceded by twelve lictors carrying the fasces or bundles of sticks, in the middle of which appeared an axe.

The consuls always commanded the armies; and this important prerogative was so alluring in the eyes of the plebeians, that they made incredible efforts to obtain the consulship.

After the republic was destroyed, consuls were continued under the emperors; but the office retained nothing of its dignity and usefulness, and sunk into a mere title.

CONSUL, at present, is an officer established by virtue of a commission from the king and other princes, in all foreign countries of any considerable trade, to facilitate and dispatch business, and protect the merchants of the nation. The consuls are to keep up a correspondence with the ministers of England residing in the courts whereon their consulate depends.

CO'NSULAR. *a.* (*consularis*, Latin.) 1. Relating to the consul (*Spectator*). 2. CONSULAR *Man*. One who had been consul (*Ben Jonson*).

CO'NSULATE. *s.* (*consulatus*, Lat.) The office of consul (*Addison*).

CO'NSULSHIP. *s.* (from *consul.*) The office of consul (*Ben Jonson*).

To CONSU'LT. *v. n.* (*consulto*, Latin.) To take counsel together (*Clarendon*).

To CONSU'LT. *v. a.* 1. To ask advice of: as, *to* consult *a friend*. 2. To regard; to act with view or respect to (*L'Estrange*). 3. To plan; to contrive (*Clarendon*).

CONSU'LT. *s.* (from the verb.) 1. The act of consulting (*Dryden*). 2. The effect of consulting; determination. 3. A council; a

number of persons assembled in deliberation (*Swift*).

CONSULTA'TION. *s.* (from *consult.*) 1. The act of consulting; secret deliberation (*Mark*). 2. A number of persons consulted together; a council (*Wiseman*).

CONSULTATION, in law, a writ by which a cause being removed from the spiritual court to the king's court, is returned thither again; and the reason is, that if the judges of the king's court, by comparing the libel with the suggestion of the party, find the suggestion false or not proved, and on that account the cause to be wrongfully called from the ecclesiastical court, then upon this consultation or deliberation they decree it to be returned. This writ is in the nature of a procedendo; yet properly a consultation ought not to be granted, only in cases where a person cannot recover at the common law. In causes of which the ecclesiastical and spiritual courts have jurisdiction, and they are not mixed with any temporal thing; if suggestion is made for a prohibition, a consultation shall be awarded. See PROHIBITION.

CONSU'LTER. *s.* (from *consult.*) One that consults, or asks counsel (*Deuteronomy*).

CONSU'MABLE. *a.* (from *consume.*) Susceptible of destruction (*Wilkins*).

To CONSU'ME. *v. a.* (*consumo*, Latin.) To waste; to spend; to destroy (*Thomson*).

To CONSU'ME. *v. n.* To waste away; to be exhausted (*Shakspeare*).

CONSU'MER. *s.* (from *consume.*) One that spends, wastes, or destroys any thing (*Locke*).

To CONSU'MMATE. *v. a.* (*consommer*, Fr.) To complete; to perfect (*Shakspeare*).

CONSU'MMATE. *a.* (from the verb.) Complete; perfect (*Addison*).

CONSUMMA'TION. *s.* (from *consummate.*) 1. Completion; perfection; end (*Addison*). 2. The end of the present system of things. 3. Death; end of life (*Shakspeare*).

CONSU'MPTION. *s.* (*consumptio*, Latin.) 1. The act of consuming; waste; destruction (*Locke*). 2 The state of wasting or perishing (*Woodward*).

CONSUMPTION. In medicine. A decline. See PHTHISIS PULMONALIS.

CONSU'MPTIVE. *a.* (from *consume.*) 1. Destructive; wasting; exhausting (*Addison*). 2. Diseased with a consumption (*Harvey*).

CONSU'MPTIVENESS. *s.* (from *consumptive.*) A tendency to a consumption.

CONSUS, the Pagan god of counsel.

CONSU'TILE. *a.* (*consutilis*, Latin.) That is sewed or stitched together.

CONTABE'SCENT. (from *contabesco*, to pine or waste away.) Marcescent: universally consuming; wasting away in every organ of the animal system.

To CONTA'BULATE. *v. a.* (*contabulo*, Lat.) To floor with boards.

CONTABULA'TION. *s.* (*contabulatio*, Lat.) A joining of boards together.

CO'NTACT. *s.* (*contactus*, Latin.) Touch; close union (*Newton*).

CONTACT, is when one line, plane, or body is made to touch another, and the parts that do thus touch are called the points or places of contact. The contact of two spherical bodies, and of a tangent with the circumference of a circle, is only in one point.

It has been much disputed whether any two bodies can possibly be brought into contact: but, as we see no medium between admitting the possibility of contact, and adopting the opinions of either Berkeley or Boscovich, we shall not waste either time or space by detailing the principal arguments that have been adduced in this controversy.

CONTACT (Angle of), is the opening between a curve line and a tangent to it.

This, also, has been the fruitful theme of many disquisitions; as may be seen in the works of Peletarius, Clavius, Wallis, Maclaurin, &c.

CONTA'CTION. *s.* (*contactus*, Lat.) The act of touching (*Brown*).

CONTAGION. (*contagio*, from *contingo*, to meet or touch each other). Effluvia. Miasma. Virus. Lues. Infection. The very subtile particles arising from putrid or other substances, or from persons labouring under contagious diseases, which communicate the disease to others; thus the contagion of putrid fever, the effluvia of dead animal or vegetable substances, the miasm of bogs and fens, the virus of small-pox, lues venerea, &c. &c. There does not appear to be any proper distinction between contagious and infectious diseases: and hence an indiscriminate use of these terms, which are, nevertheless, at times employed differently by some practitioners, has produced much misconception and confusion in medical terminology. From the origin of the word, contagion ought, perhaps, to be restricted to diseases communicated by actual contact alone, as the venereal disease, itch, &c.: and then it could never interfere with infection. But if we allow it to assume a broader meaning, contagion should, at least, be limited to those diseases which are propagated by the miasm of a diseased body, and which, of course, do not extend their influence beyond the reach of the aroma, or affected atmosphere of such body, as in small-pox, scarlet-fever, typhus, and measles. While infection should be confined to diseases produced by a pestilential or miasmic state of the atmosphere generally, and independently of the diseased themselves; and may hence be synonymous with the matter of epidemic or endemic disorders. Upon this division, catarrhs and agues may result from infection; malignant sore throat and small-pox from contagion. And so of the rest. For the most approved modes of prevention by fumigations, &c. see INFECTION and SEPTON.

CONTA'GIOUS. *a.* (from *contagio*, Latin.) Infectious; caught by approach (*Prior*).

CONTA'GIOUSNESS. *s.* (from *contagious.*) The quality of being contagious.

To CONTA'IN. *v. a.* (*contineo*, Latin.) 1. To hold, as a vessel (*John*). 2. To comprehend; to comprise (*Milton*). 3. To restrain; to withhold (*Spenser*).

To CONTA'IN. *v. n.* To live in continence or chastity (*Arbuthnot*).

CONTA'INABLE. *a.* (from *contain.*) Possible to be contained (*Boyle*).

To CONTA'MINATE. *v. a.* (*contamino*, Lat.) To defile; to corrupt by base mixture (*Shakspeare*).

CONTAMINA'TION. *s.* (from *contaminate.*) Pollution; defilement.

CONTE'MERATED. *a.* (*contemeratus*, Lat.) Violated; polluted.

To CONTE'MN. *v. a.* (*contemno*, Latin.) To despise; to scorn; to slight; to neglect (*Dryden*).

CONTE'MNER. *s.* (from *contemn.*) One that contemns; a despiser (*South*).

To CONTE'MPER. *v. a.* (*contempero*, Lat.) To moderate by mixture (*Ray*).

CONTE'MPERAMENT. *s.* (from *contempero*, Latin.) The degree of any quality as tempered to others (*Derham*).

To CONTE'MPERATE. *v. a.* (from *contempero*, Latin.) To moderate; to temper by mixture (*Wiseman*).

CONTEMPERA'TION. *s.* (from *contemperate.*) 1. The act of moderating or tempering (*Brown*). 2. Proportionate mixture; proportion (*Hale*).

To CONTE'MPLATE. *v. a.* (*contemplor*, Lat.) To study; to meditate (*Watts*).

To CONTE'MPLATE. *v. a.* To muse; to think studiously with long attention (*Dryden*).

CONTEMPLA'TION. *s.* (from *contemplate.*) 1. Meditation; studious thought on any subject; continual attention (*Shakspeare*). 2. Holy meditation; a holy exercise of the soul, employed in attention to sacred things. 3. Study: opposed to action (*South*).

CONTE'MPLATIVE. *a.* (from *contemplate.*) 1. Given to thought or study; studious; thoughtful (*Denham*). 2. Employed in study; dedicated to study. 3. Having the power of thought (*Ray*).

CONTE'MPLATIVELY. *ad.* Thoughtfully; attentively; with deep attention.

CONTEMPLA'TOR. *s.* (Latin.) One employed in study (*Raleigh*).

CONTE'MPORARY. *a.* (*contemporain*, Fr.) 1. Living in the same age (*Dryden*). 2. Born at the same time (*Cowley*). 3. Existing at the same point of time (*Locke*).

CONTE'MPORARY. *s.* One who lives at the same time with another (*Dryden*).

To CONTE'MPORISE. *v. a.* (*con* and *tempus*, Latin.) To make contemporary (*Brown*).

CONTE'MPT. *s.* (*contemptus*, Latin.) 1. The act of despising others; scorn (*South*). 2. The state of being despised; vileness.

Contempt directs its chief attention to the character and disposition, which is capable of committing unworthy and disgraceful actions. Its objects are radical baseness, and radical imbecility where it ought not to exist. Thus the characters which are sunk below the common level of humanity, and those which arrogantly and impotently attempt to rise above it, are universally deemed the proper objects of contempt. Both indignation and contempt are accompanied with a certain supposed elevation of mind. The observer feels and enjoys a conscious superiority when he compares himself with the offender. This sense of superiority is strongly marked in contempt; when it arises to such a degree as precludes any commerce with the party despised, it becomes disdain. (*Cogan*, p. 173).

CONTEMPT, in law, is a disobedience to the rules and orders of a court, which hath power to punish such offence; and as this is sometimes a greater, and sometimes a lesser offence, so it is punished with greater or less punishment, by fine, and sometimes by imprisonment.

CONTE'MPTIBLE. *a.* (from *contempt.*) 1. Worthy of contempt; deserving scorn. 2. Despised; scorned; neglected (*Locke*). 3. Scornful; apt to despise (*Shakspeare*).

CONTE'MPTIBLENESS. *s.* (from *contemptible*). The state of being contemptible; vileness; baseness (*Decay of Piety*).

CONTE'MPTIBLY. *ad.* (from *contemptible.*) Meanly; in a manner deserving contempt.

CONTE'MPTUOUS. *a.* (from *contempt.*) Scornful; apt to despise; using words or actions of contempt; insolent (*Atterbury*).

CONTE'MPTUOUSLY. *ad.* With scorn; with despite (*Tillotson*).

CONTE'MPTUOUSNESS. *s.* (from *contemptuous.*) Disposition to contempt.

To CONTE'ND. *v. n.* (*contendo*, Latin.) 1. To strive; to struggle in opposition (*Shakspeare*). 2. To vie; to act in emulation (*Dryden*).

To CONTE'ND. *v. a.* To dispute any thing; to contest (*Dryden*).

CONTE'NDENT. *s.* (from *contend.*) Antagonist; opponent: not used (*L'Estrange*).

CONTE'NDER. *s.* (from *contend.*) Combatant; champion (*Locke*).

CONTE'NT. *a.* (*contentus*, Latin.) 1. Satisfied, so as not to repine; easy (*Pope*). 2. Satisfied, so as not to oppose (*Shakspeare*).

To CONTE'NT. *v. a.* (from the adjective.) 1. To satisfy, so as to stop complaint (*Tillotson*). 2. To please; to gratify (*Shakspeare*).

CONTE'NT. *s.* (from the verb.) 1. Moderate happiness (*Shakspeare*). 2. Acquiescence; satisfaction in a thing unexamined (*Pope*). 3. That which is contained, or included, in any thing (*Woodward*). 4. The power of containing; extent; capacity (*Graunt*). 5. That which is comprised in writing (*Addison*).

CONTENT, in geometry, the area or quantity of matter or space included in certain bounds. The content of a tun of round timber is 43 solid feet. A load of hewn timber contains 50 cubic feet; in a foot of timber are contained 1728 cubic or square inches; and as often as 1728 inches are contained in a piece of timber, be it round or square, so many feet of timber are contained in the piece. See GAUGING, MENSURATION, &c.

CONTENTA'TION. *s.* (from *content.*) Satisfaction; content: out of use (*Sidney*).

CONTE'NTED. *part. a.* (from *content.*) Satisfied; at quiet; not repining; easy (*Knolles*).

CONTE'NTION. *s.* (*contentio*, Latin.) 1. Strife; debate; quarrel (*Decay of Piety*). 2. Emulation; endeavour to excel (*Shakspeare*). 3. Eagerness; zeal; ardour (*Rogers*).

CONTE'NTIOUS. *a.* (from *contend.*) Quarrelsome; given to debate; perverse (*Shakspeare*).

CONTE'NTIOUS JURISDICTION. A court which has a power to judge and determine differences between contending parties (*Chambers*).

CONTE'NTIOUSLY. *ad.* (from *contentious.*) Perversely; quarrelsomely (*Brown*).

CONTE'NTIOUSNESS. *s.* (from *contentious.*) Proneness to contest; perverseness; turbulence; quarrelsomeness (*Bentley*).

CONTE'NTLESS. *a.* (from *content.*) Discontented; dissatisfied; uneasy (*Shakspeare*).

CONTE'NTMENT. *s.* (from *content.*) 1. Acquiescence, without plenary satisfaction (*Hooker. Grew*). 2. Gratification (*Wotton*).

This word expresses the acquiescence of the mind, in the portion of good we possess. It implies a perception that our lot might have been better, or that it is inferior to what others enjoy, or that it does not fully answer the expectations we had formed. An effort of reason, or of prudence, or of religion, is necessary to produce it. We compare our present with our former situation, or with what we deserve, or with the inferior lot of others; and thus learn to acquiesce in the degree of advantage obtained. Dr. Barrow has some fine Sermons on the Duty and Advantage of Contentment.

CONTE'RMINOUS. *a.* (*conterminus*, Lat.) Bordering upon (*Hale*).

CONTERRA'NEOUS. *a.* (*conterraneus*, Lat.) Of the same country.

To CONTE'ST. *v. a.* (*contester*, Fr.) To dispute; to controvert; to litigate (*Dryden*).

To CONTE'ST. *v. n.* 1. To strive; to contend (*Burnet*). 2. To vie; to emulate (*Pope*).

CO'NTEST. *s.* (from the verb.) Dispute; difference; debate (*Denham*).

CONTE'STABLE. *a.* (from *contest.*) Disputable; controvertible.

CONTE'STABLENESS. *s.* (from *contestable.*) Possibility of contest.

CONTESTA'TION. *s.* (from *contest.*) The act of contesting; debate; strife (*Clarendon*).

To CONTE'X. *v. a.* (*contexo*, Latin.) To weave together: not in use (*Boyle*).

CO'NTEXT. *s.* (*contextus*, Latin.) The general series of a discourse (*Hammond*).

CO'NTEXT. *a.* (from *contex.*) Knit together; firm (*Derham*).

CONTE'XTURE. *s.* (from *contex.*) The disposition of parts one among others; the system; the constitution (*Blackmore*).

CONTIGNA'TION. *s.* (*contignatio*, Lat.) 1. A frame of beams joined together; a story (*Wotton*). 2. The act of framing or joining a fabrick of wood.

CONTIGU'ITY. *s.* (from *contiguous.*) Actual contact (*Brown. Hale*).

CONTI'GUOUS. *a.* (*contiguus*, Lat.) Meeting so as to touch (*Newton*).

CONTI'GUOUSLY. *ad.* (from *contiguous.*) Without any intervening spaces (*Dryden*).

CONTI'GUOUSNESS. *s.* (from *contiguous*). Close connexion; coherence.

CO'NTINENCE. CO'NTINENCY. *s.* (*continentia*, Latin.) 1. Restraint; command of one's self (*Dryden*). 2. Chastity in general (*Shakspeare*). 3. Forbearance of lawful pleasure (*Grew*). 4. Moderation in lawful pleasures (*Taylor*). 5. Continuity; uninterrupted course (*Ayliffe*).

CO'NTINENT. *a.* (*continens*, Latin.) 1. Chaste; abstemious in lawful pleasures (*Shakspeare*). 2. Restrained; moderate; temperate (*Shakspeare*). 3. Continuous; connected (*Brerewood*). 4. Opposing; restraining (*Shakspeare*).

CO'NTINENT. *s.* (*continens*, Latin.) In geography, a great extent of land, containing several kingdoms, nations, or states, not separated from one another by seas. As the continent of Europe, America, &c.

The same word is also sometimes applied as a substantive to denote that which contains any thing.

To CONTI'NGE. *v. n.* (*contingo*, Latin.) To touch; to reach; to happen.

CONTI'NGENCE. CONTI'NGENCY. *s.* (from *contingent.*) The quality of being fortuitous; accidental possibility (*Brown*).

CONTI'NGENT. *a.* (*contingens*, Latin.) Falling out by chance; accidental (*South*).

CONTI'NGENT. *s.* 1. A thing in the hands of chance (*Grew*). 2. A proportion that falls to any person upon a division.

CONTINGENT, a term of relation for the quota that falls to any person upon a division. Thus each prince in Germany, in time of war, is to furnish so many men, so much money and ammunition for his contingent.

CONTINGENT USE, in law, an use limited in a conveyance of lands which may or may not happen to vest, according to the contingency mentioned in the limitation of the use. And a contingent remainder is, when an estate is limited to take place at a time to come, on an uncertain event.

CONTINGENT LEGACY, is a legacy which may, or may not happen. If a legacy be left to one when he shall attain, or if he shall attain the age of twenty-one years, this is a contingent legacy, and if the legatee die before that time, the legacy shall not vest. But a legacy to one to be paid when he attains the age of twenty-one years is a vested legacy; an interest which commences *in præsenti*, although it be *solvendum in futuro*: and if the legatee die before that age, his representatives shall receive it out of the testator's personal estate, at the same time that it would have become payable in case the legatee had lived.

CONTI'NGENTLY. *ad.* Accidentally; without any settled rule (*Woodward*).

CONTI'NGENTNESS. *s.* Accidentalness; fortuitousness.

CONTI'NUAL. *a.* (*continuus*, Latin.) 1. Incessant; proceeding without interruption (*Pope*). 2. (In law.) A continual claim is made from time to time, within every year and day (*Cowley*).

Continual proportionals, are a series of three or more quantities compared together, so that the ratio is the same between every two adjacent terms, viz. between the 1st and 2d, the 2d and 3d, the 3d and 4th, &c.

CONTI'NUALLY. *ad.* 1. Without pause; without interruption (*Bacon*). 2. Without ceasing (*Bentley*).

CONTI'NUANCE. *s.* (from *continue*). 1. Succession uninterrupted (*Addison*). 2. Permanence in one state (*South*). 3. Abode in a place. 4. Duration; lastingness (*Hayward*). 5. Perseverance (*Romans*).

Continuance, in law, is the continuing of a cause in court by an entry made for that purpose upon the records there

Continuance of a writ or action, is its continuing in force from one term to another, where the sheriff has not returned a former writ issued out in the same action. With respect to continuances, the court of king's bench is not to enter them on the roll till after issue or demurrer, and then they enter the continuance of all on the back before judgment.

CONTINUANDO, a term used in a special declaration of trespass, where the plaintiff would recover damages for several trespasses in one and the same action. To avoid multiplicity of suits, a person may in one action of trespass recover damages for many trespasses committed, by laying the same to be done with a continuando.

CONTI'NUATE. *a.* (*continuatus*, Latin.) 1. Immediately united (*Hooker*). 2. Uninterrupted; unbroken (*Shakspeare*).

CONTI'NUATELY. *ad.* With continuity; without interruption (*Wilkins*).

CONTINUA'TION. *s.* (from *continuate.*) Protraction, or succession uninterrupted (*Ray*).

CONTI'NUATIVE. *s.* (from *continuate.*) An expression noting permanence or duration (*Watts*).

CONTINUA'TOR. *s.* (from *continuate.*) He that continues or keeps up the series of succession (*Brown*).

To CONTI'NUE. *v. n.* (*continuer*, French.) 1. To remain in the same state (*Milton*). 2. To last; to be durable (*Brown*). 3. To persevere (*Milton*).

To Conti'nue. *v. a.* 1. To protract, or hold without interruption (*Pope*). 2. To unite without a chasm, or intervening substance (*Milton*).

CONTINUED QUANTITY, or body, is that whose parts are joined and united together.

Continued proportion, is that in which the consequent of the first ratio is the same with the antecedent of the second: as in these, 3 : 6 : : 6 : 12.

CONTI'NUEDLY. *ad.* (from *continued.*) Without interruption; without ceasing (*Nor.*).

CONTI'NUER. *s.* (from *continue.*) That which has the power of perseverance (*Shakspeare*).

CONTINU'ITY. *s.* (*continuitas*, Lat.) Connexion uninterrupted; cohesion; close union (*Bacon*).

Continuity (Law of), is that by which variable quantities passing from one magnitude to another, pass through all the intermediate magnitudes, without ever passing over any of them abruptly. Many philosophers and metaphysicians have asserted the probable conformity of natural operations to this law; but father Boscovich goes farther, and proves that the law is universal. Thus we see that the distances of two bodies can never be changed without their passing through all the intermediate distances. We see the planets move each with different velocities and directions in the several parts of its orbit; but still observing the law of continuity. In heavy bodies projected the velocity increases and decreases through all the intermediate velocities: and the same happens with regard to electricity and magnetism. No body becomes more or less dense without passing through the intermediate densities. The light of the day increases in the morning and decreases at night, through all the intermediate possible degrees. And thus, if we go through nature, we shall, if all things be rightly contemplated, see the law of continuity strictly to take place. We sometimes, it is true, make abrupt transitions in our minds; as, when we compare the length of one day with that of another immediately following, and say that the latter is two or three minutes longer or shorter than the former, passing all at once, in the common way of speaking, completely round the globe; but if we consider the several intervening longitudes, we shall find days of all the intermediate lengths. Sometimes also we confound a quick motion with an instantaneous one: thus we are apt to imagine that a ball is thrown abruptly out of a gun when fired; but, in truth, some space of time is required for the gradual inflammation of the powder, the rarefaction of the air, and the communication of motion to the ball. In like manner all the other apparent objections to the law may be satisfactorily solved.

But however forcible this argument from induction may be, Boscovich goes still farther, and maintains that a breach of this law, in the proper cases, is metaphysically impossible. This argument he draws from the very nature of continuity. It is essential to continuity that, where one part of the thing continued ends and another part begins, the limit will be common to both. Thus, when a geometrical line is divided into two, an indivisible point is the common limit of both: thus time is continued; and therefore where one hour ends, another immediately begins, and the common limit is

an indivisible instant. Now, as all variations in variable quantities are accomplished in time, they all partake of its continuity; and hence none of them can hasten by an abrupt transition from one magnitude to another, without passing through the intermediate magnitudes. As we cannot pass from the sixth hour to the ninth without passing through the seventh and eighth; because, if we did, there would be a common limit between the sixth hour and the ninth, which is impossible; so likewise you cannot go from the distance 6 to the distance 9 without passing through the distances 7 and 8; because, if you did, in the instant of passage you would be both at the distance 6 and at the distance 9, which is impossible. In like manner, a body that is condensed or rarefied cannot pass from the density 6 to the density 9, or *vice versa*, without passing through the densities 7 and 8; because, in the abrupt passage, there would be two densities, 6 and 9, in the same instant. The body must pass through all the intermediate densities. This it may do quickly or slowly, but still it must evidently pass through them all. The like may be said of all variable quantities; and thence we may conclude that the law of continuity is universal.

Still, however, this law is subject to difficulties: for, rigorously taken, it supposes actual, and yet infinitely small changes, which some philosophers will not assent to; and, if we suppose changes only imperceptible to our senses, but finite, the law of continuity is no less violated than if the universe were to be suddenly destroyed: as M. Maupertuis observed, Mem. de l'Acad. de Berlin, tom. ii. pa. 284.

CONTI'NUOUS. *a.* (*continuus*, Latin.) Joined together without the intervention of any space (*Newton*).

CONTOPÆCTÆ, (κοντος, pole, and πηκτος, compact,) in antiquity, a sort of artists who supported a pole on their foreheads so firmly, that boys could play, dance, and wrestle together on it.

To CONTO'RT. *v. a.* (*contortus*, Latin.) To twist; to writhe (*Ray*).

CONTORTÆ, in botany (*contorqueo*, to twist together). The twenty-ninth order in the fragments of a natural method, in the Philosophia Botanica, and the thirtieth of the natural orders in the Genera Plantarum.

CONTORTED. In botany, applied to the corol and pericarp. A contorted corol has the edge of one petal lying over the next, in an oblique direction; as in vinca. A contorted pericarp is that, which has the apex in a different line from the base. It i snearly synonymous with twisted.

CONTO'RTION. *s.* (from *contort.*) Twist; wry motion; flexure (*Ray*).

CONTO'RTION, in medicine, has many significations. 1. It denotes the iliac passion. 2. An incomplete dislocation, when a bone is in part, but not entirely, forced from its articulation. 3. A dislocation of the vertebræ of the back sideways, or a crookedness of these vertebræ. And, 4. A disorder of the head, in which it is drawn towards one side, either by a spasmodic contraction of the muscles on the same side, or a palsy of the antagonist muscles on the other.

CONTORTUPLICATE. In botany. See WRITHED.

CONTO'UR. *s.* (French.) The outline; the line by which any figure is defined or terminated.

CONTOURNIATED, a term applied by antiquaries to medals, the edges of which appear as if turned in a lathe, having a broad rising rim on each side.

CO'NTRA. A Latin preposition, used in composition, which signifies *against*.

CO'NTRABAND. *a.* (*contrabando*, Ital.) Prohibited; illegal; unlawful (*Dryden*).

To CO'NTRABAND. *v. a.* (from the adjective.) To import goods prohibited.

CO'NTRABAND, in commerce, a prohibited commodity or merchandise bought or sold, imported or exported, in prejudice to the laws and ordinances of a state, or the public prohibitions of the sovereign. Contraband goods are not only liable to confiscation themselves, but also subject all other merchandise found with them in the same box, bale, or parcel, together with the horses, waggons, &c. which conduct them. There are contrabands likewise, which, besides the forfeiture of the goods, are attended with several penalties and disabilities.

The principal goods prohibited to be imported into Great Britain, are *alamodes and lustrings, except in the port of London, and by licence; *ammunition, without licence from the king; *arms, without licence from the king; * bits for bridles; * popish books; brandy or rum, in casks less than 60 gallons, or in ships less than 15 tons burden; * buttons of all sorts; printed, painted, stained, or dyed calicoes; cards for wool, and playing cards; * chocolate ready made, or cocoa paste; cinnamon, without licence, except from India; * woollen cloths; * dice; leather gloves; East India, Persia, and China wrought silks, Bengals, stuffs mixed with silk, or herba, except into the port of London, and under special regulations; * fringes of silk or thread; gold or silver thread, lace, fringe, or other works made thereof; * malt from beyond sea; * salt in ships under twenty tons, or not in bulk; * silk embroidered, twined silk; * wrought silk mixed with gold, silver, or other materials; * tea, except by the India company; tobacco manufactured; *utensils of war, without licence from the king; * cut whalebone.

Goods prohibited to be exported are, boxes, cases, or dial-plates, for clocks and watches, without the movement and makers' names; bullion, without proper certificates, &c.; frames for stockings; metal not of British ore, except copper-bars; wool; scouring and fuller's clay; sheep and sheepskins with the wool; tallow; utensils used in the silk and woollen manufactory; white ashes, &c.

N. B. Such goods in the preceding list as have an asterisk prefixed before them, besides

the forfeiture in common with the rest, are attended with several penalties. (*Gregory's Cyclo.*).

To CONTRA'CT. *v. a.* (*contractus*, Lat.) 1. To draw together into less compass. 2. To lessen; to make less ample (*G. of T.*) 3. To draw the parts of any thing together (*Milton*). 4. To make a bargain (*Dryden*). 5. To betroth; to affiance (*Tatler*). 6. To procure; to bring; to incur; to draw; to get (*King Charles*). 7. To shorten; to abridge.

To CONTRA'CT. *v. a.* 1. To shrink up; to grow short (*Arbuthnot*). 2. To bargain: as, *to* contract *for a quantity of provisions.*

CONTRA'CT. *part. a.* (from the verb.) Affianced; contracted (*Shakspeare*).

CO'NTRACT. *s.* 1. A bargain; a compact (*Temple*). 2. An act whereby a man and woman are betrothed to one another (*Shakspeare*). 3. A writing in which the terms of a bargain are included.

CONTRACTED VEIN, in hydraulics (*vena contracta* of Newton), a name given to the contraction which has been observed in a stream of fluid issuing from an aperture. See HYDRAULICS.

CONTRACTED PANICLE. In botany, close and narrow, so as very much to resemble a spike. As in festuca calycina.

CONTRA'CTEDNESS. *s.* (from *contracted.*) The state of being contracted; contraction.

CONTRACTIBI'LITY. *s.* (from *contractible.*) Possibility of being contracted (*Arbuthnot*).

CONTRA'CTIBLE. *a.* (from *contract.*) Capable of contraction (*Arbuthnot.*)

CONTRA'CTIBLENESS. *s.* (from *contractible.*) The quality of suffering contraction.

CONTRA'CTILE. *a.* (from *contract.*) Having the power of shortening itself (*Arbuthnot*).

CONTRA'CTILITY. The opposite of expansive elasticity. A property in bodies, the effect of the cohesive power, by which their particles resume their former propinquity when the force ceases which was applied to separate them.

CONTRA'CTION. *s.* (*contractio*, Latin.) 1. The act of contracting or shortening (*Pope*). 2. The act of shrinking or shrivelling (*Arbuthnot*). 3. The state of being contracted, or drawn into a narrow compass (*Newton*). 4. (In grammar.) The reduction of two vowels or syllables to one. 5. Abbreviation: as, *the writing is full of* contractions.

CONTRACTION. (*contractio*, from *contraho*, to draw together). Contractura. A rigid contraction of the joints. It is a genus of disease in the class locales, and order dyscinesiæ of Cullen. The species are, 1. Contractura ab inflammatione, when it arises from inflammation. 2. Contractura à spasmo, called also tonic spasm (an absurd but common term), and cramp, when it depends upon spasm. 3. Contractura ab antagonistas paraliticos, from the antagonist muscles losing their action. 4. Contractura ab acrimoniâ irritante, which is induced by some irritating cause. 5. Contractura articularis, originating from a disease of the joint.

CONTRACTION, in physics, the diminishing the extent or dimensions of a body, or the causing its parts to approach nearer to each other, in which sense it stands opposed to dilatation or expansion. See EXPANSION.

Water and all aqueous fluids are gradually contracted by a diminution of temperature, until they arrive at a certain point, which is about 8° above the freezing point; but below that point they begin to expand, and continue to do so according as the temperature is lowered. Similar effects have been observed with regard to some metals. Speaking of contraction, a remarkable phenomenon, of considerable importance in manufactures, obtrudes itself on our notice. It is the hardness which certain bodies acquire in consequence of a sudden contraction, and this is particularly the case with glass and some of the metals. Thus, glass vessels, suddenly cooled after having been formed, are so very brittle that they hardly bear to be touched with any hard body. The cause of this effect is thus properly explained by Dr. Young. "When glass in fusion is very suddenly cooled, its external parts become solid first, and determine the magnitude of the whole piece, while it still remains fluid within. The internal part, as it cools, is disposed to contract still further, but its contraction is prevented by the resistance of the external parts, which form an arch or vault round it, so that the whole is left in a state of constraint; and as soon as the equilibrium is disturbed in any one part, the whole aggregate is destroyed. Hence it becomes necessary to anneal all glass, by placing it in an oven, where it is left to cool slowly; for, without this precaution, a very slight cause would destroy it. The Bologna jars, sometimes called proofs, are small thick vessels made for the purpose of exhibiting this effect; they are usually destroyed by the impulse of a small and sharp body; for instance, a single grain of sand, dropped into them, and a small body appears to be often more effectual than a larger one; perhaps because the larger one is more liable to strike the glass with an obtuse part of its surface." (*Rees's Cyclo.*). On this subject see also Dalton's Chemistry.

CONTRA'CTOR. *s.* (from *contract.*) One of the parties to a contract or bargain (*Taylor*).

To CONTRADI'CT. *v. a.* (*contradico*, Lat.) 1. To oppose verbally (*Dryden*). 2. To be contrary to; to repugn (*Hooker*).

CONTRADI'CTER. *s.* (from *contradict.*) One that contradicts; an opposer (*Swift*).

CONTRADI'CTION. *s.* (from *contradict.*) 1. Verbal opposition; controversial assertion (*Milton*). 2. Opposition (*Hebrews*). 3. Inconsistency; incongruity (*South*). 4. Contrariety, in thought or effect (*Sidney*).

CONTRADI'CTIOUS. *a.* (from *contradict.*) 1. Filled with contradiction; inconsistent. 2. Inclined to contradict; given to cavil.

CONTRADI'CTIOUSNESS. *s.* 1. Inconsistency; contrariety to itself (*Norris*). 2. Disposition to cavil; disputatious temper.

CONTRADI'CTORILY. *ad.* Inconsistently with himself; oppositely to others (*Brown*).

CONTRADI'CTORY. *a.* (*contradictorius*, Latin.) Opposite to; inconsistent with (*South*).

CONTRADICTORY PROPOSITIONS, are opposites, one of which imports a mere and naked denial of the other. Seeming contradictories are, when the members of a period quite disagree in appearance and sound, but perfectly agree and are consistent in sense: thus, Shakspeare says,

"Cowards die many times before their death:
The valiant never taste of death but once."

CONTRADISTI'NCTION. *s.* Distinction by opposite qualities (*Glanville*).

To CONTRADISTI'NGUISH. *v. a.* (*contra* and *distinguish.*) To distinguish by opposite qualities (*Locke*).

CONTRAFI'SSURE. *s.* (*contra* and *fissure.*) A crack of the skull where the blow was inflicted, is called fissure; but in the contrary part, *contrafissure* (*Wiseman*).

CONTRA-HARMONICAL PROPORTION, that relation of three terms, wherein the difference of the first and second is to the difference of the second and third, as the third is to the first.

To CONTRAI'NDICATE. *v. a.* (*contra* and *indico*, Lat.) To point out some peculiar symptom, contrary to the general tenour of the malady (*Harvey*).

CONTRAINDICA'TION. (*contra-indicatio*, from *contra*, against, and *indico*, to show). A symptom attending a disease, which forbids the exhibition of a remedy that would otherwise be employed.

CONTRALTO. (Italian.) In music, the counter-tenor.

CONTRAMURE. *s.* (*contremure*, Fr.) An out-wall built about the main wall of a city.

CONTRANI'TENCY. *s.* (*contra* and *nitens*, Latin.) Reaction; a resistency against pressure.

CONTRAPOSI'TION. *s.* (*contra* and *position.*) A placing over against.

CONTRAREGULA'RITY. *s.* (*contra* and *regularity.*) Contrariety to rule (*Norris.*)

CONTRA'RIANT. *a.* (*contrariant*, Fr.) Inconsistent; contradictory (*Ayliffe*).

CO'NTRARIES. *s.* (from *contrary.*) In logick, propositions which destroy each other.

CONTRARI'ETY. *s.* (from *contrarietas*, Latin.) 1. Repugnance; opposition (*Wotton*). 2 Inconsistency; quality or position destructive of its opposite (*Shakspeare*).

CONTRA'RILY. *ad.* (from *contrary.*) 1. In a manner contrary (*Ray*). 2. Different ways; in different directions.

CONTRA'RINESS. *s.* (from *contrary.*) Contrariety; opposition.

CONTRA'RIOUS. *a.* (from *contrary.*) Opposite; repugnant (*Milton*).

CONTRA'RIOUSLY. *ad.* Oppositely (*Shakspeare*).

CONTRA'RIWISE. *ad.* 1. Conversely (*Bacon*). 2. Oppositely (*Raleigh*).

CO'NTRARY. *a.* (*contrarius*, Latin.) 1. Opposite; contradictory (*Davies*). 2. Inconsistent; disagreeing (*Tillotson*). 3. Adverse; in an opposite direction (*Matt.*)

CO'NTRARY. *s.* (from the adjective.) 1. A thing of opposite qualities (*Cowley*). 2. A proposition contrary to some other; a fact contrary to the allegation (*Locke*). 3. *On the* CONTRARY. In opposition; on the other side (*Swift*). 4. *To the* CONTRARY. To a contrary purpose; to an opposite intent (*Stillingfleet*).

To CO'NTRARY. *v. a.* (*contrarier*, Fr.) To oppose; to thwart; to contradict (*Latimer*).

CO'NTRAST. *s.* (*contraste*, French.) Opposition and dissimilitude of figures, by which one contributes to the visibility or effect of another.

CONTRAST, in painting and sculpture, expresses an opposition or difference of position, attitude, &c. of two or more figures, contrived to make a variety in a painting, &c. as where in a groupe of three figures, one is shown before, another behind, and another side-ways, they are said to be in contrast. The contrast is not only to be observed in the position of figures, but also in that of the several members of the same figure: thus, if the right arm advance farthest, the right leg is to be hindermost; if the eye be directed one way, the arm is to go the contrary way, &c. The contrast must be pursued even in the drapery.

To CONTRA'ST. *v. a.* (from the noun.) 1. To place in opposition. 2. To show another figure to advantage (*Dryden*).

CONTRATE-WHEEL, in watch-work, that next to the crown, the teeth and hoop of which lie contrary to those of the other wheels, whence it takes its name.

CONTRAVALLA'TION. *s.* (*contra* and *vallo*, Latin.) The fortification thrown up, to hinder the sallies of the garrison (*Watts*).

To CONTRAVE'NE. *v. a.* (*contra* and *venio*, Latin.) To oppose; to obstruct; to baffle.

CONTRAVE'NER. *s.* (from *contravene.*) He who opposes another.

CONTRAVE'NTION. *s.* (French.) Opposition (*Swift*).

CONTRAVENTION, in law, a man's failing to discharge his word, obligation, duty, or the laws or customs of the place.

CONTRAYERVA. A term of Spanish origin, and derived from *contra*, against; and *yerva*, a herb or plant; the Spaniards often exchanging the Latin *h* for *y*, as again in *yedra* for *hedera*, ivy; in the same manner as they exchange the Latin *f* for *h*, writing *hermoso* for *formosus*, *higo* for *ficus*. An antagonist herb, an antidote to poison. The officinal part of this plant is the root, which is obtained from various species of dorstenia, especially the dorstenia contrayerva, and dorstenia drahena. It has a peculiar kind of aromatic smell, and a light adstringent, warm, bitterish taste; and on being long chewed discovers some-

what of a sweetish sharpness. Putrid and nervous fevers are the diseases in which this medicine was formerly used. See DORSTENIA.

CONTRAYERVA OF HERNANDEL. In botany. See PASSIFLORA.

CONTRE, in combination with words. See COUNTER.

CONTRE, in heraldry, an appellation given to several bearings, on account of their cutting the shield contrary and opposite ways: thus we meet with contre-bend, contre-chevron, contre-pale, &c. when there are two ordinaries of the same nature opposite to each other, so as colour may be opposed to metal, and metal to colour.

CONTRE COUP. A species of fracture of the skull, called in Latin *contra-fissura*, in which the fracture happens in that part of the bone opposite to where the blow was received.

CONTRECTA'TION. *s.* (*contrectatio*, Latin.) A touching or handling.

CONTRE DANCE, a rural dance borrowed from the French, in which the partners are placed opposite to each other. The usual name by which this kind of pleasing exercise is distinguished among us is *country dance*.

CONTRI'BUTARY. *a.* (*con* and *tributary*.) Paying tribute to the same sovereign (*Glanville*).

To CONTRI'BUTE. *v. a.* (*contribuo*, Lat.) To give to some common stock; to advance toward some common design (*Addison*).

To CONTRI'BUTE. *v. n.* To bear a part; to have a share in any act or effect (*Pope*).

CONTRIBU'TION. *s.* (from *contribute*.) 1. The act of promoting some design in conjunction with other persons. 2. That which is given by several hands for some common purpose (*Graunt*). 3. That which is paid for the support of an army lying in a country (*Shakspeare*).

CONTRIBUTIONE FACIENDA, in law, a writ that lies where tenants in common are bound to do the same thing, and one or more of them refuse to contribute their part; as where they jointly hold a mill pro indiviso, and equally share the profits of it, if the mill fall to decay, and one or more of the persons refuse to contribute to its reparation, the rest shall have this writ to compel them.

CONTRI'BUTIVE. *a.* (from *contribute*.) That has the power of promoting any purpose in concurrence with other motives (*Decay of Piety*).

CONTRI'BUTOR. *s.* (from *contribute*.) One that bears a part in some common design (*Shakspeare*).

CONTRI'BUTORY. *a.* (from *contribute*.) Promoting the same end; bringing assistance to some joint design.

To CONTRI'STATE. *v. a.* (*contristo*, Lat.) To sadden; to make sorrowful (*Bacon*).

CONTRISTA'TION. *s.* (from *contristate*.) Sorrow; sadness: not used (*Bacon*).

CONTRI'TE. *a.* (*contritus*, Latin.) 1. Bruised; much worn. 2. Worn with sorrow; harassed with the sense of guilt; penitent (*Rogers*).

CONTRI'TENESS. *s.* (from *contrite*.) Contrition; repentance.

CONTRI'TION. *s.* (from *contrite*.) 1. The act of grinding, or rubbing to powder (*Newton*). 2. Penitence; sorrow for sin, arising from the desire to please God (*Sprat*).

CONTRI'VABLE. *a.* (from *contrive*.) Possible to be planned by the mind; possible to be invented and adjusted (*Wilkins*).

CONTRI'VANCE. *s.* (from *contrive*.) 1. The act of contriving; excogitation; the thing contrived (*Wilkins*). 2. Scheme; plan (*Glanville*). 3. A conceit; a plot; an artifice (*Atterbury*).

To CONTRI'VE. *v. a.* (*controuver*, Fr.) 1. To plan out; to excogitate (*Tillotson*). 2. To wear away: out of use (*Spenser*).

To CONTRI'VE. *v. a.* To form or design; to plan; to scheme; to complot (*Shakspeare*).

CONTRI'VEMENT. *s.* (from *contrive*.) Invention.

CONTRI'VER. *s.* (from *contrive*.) An inventer; a schemer (*Denham*).

CONTRO'L. *s.* (*controle*, French.) 1. A register or account kept by another officer, that each may be examined by the other. 2. Check; restraint (*Waller*). 3. Power; authority; superintendence (*Shakspeare*).

To CONTRO'L. *v. a.* (from the noun.) 1. To keep under check by a counter reckoning. 2. To govern; to restrain; to subject (*Dryden*). 3. To overpower; to confute (*Bacon*).

CONTRO'LLABLE. *a.* (from *control*.) Subject to control, or command; subject to be overruled (*South*).

CONTROLLER, or COMPTROLLER, an officer appointed to control or oversee the accounts of other officers, and, on occasion, to certify whether or not things have been controlled or examined. In England we have several officers of this name; controller of the king's house, controller of the navy, controller of the customs, controller of the mint, &c.

CONTROLLER *of the hanaper*, an officer that attends the lord chancellor daily, in term and in seal time, to take all things sealed in leather bags, from the clerk of the hanaper; and to mark the number and effect thereof, and enter them in a book, with all the duties belonging to the king and other officers for the same, and so charge the clerk of the hanaper with them.

CONTROLLER *of the pipe*, an officer of the exchequer, that makes out a summons twice every year, to levy the farms and debts of the pipe.

CONTROLLERS *of the pells*, two officers of the exchequer, who are the chamberlain's clerks, and keep a control of the pell of receipt, and goings out.

CONTRO'LLERSHIP. *s.* (from *controller*.) The office of a controller.

CONTRO'LMENT *s.* (from *control*.) 1. The power or act of superintending or restraining. 2. Restraint (*Davies*). 3. Opposition;

confutation (*Hooker*). 4. Resistance; hostility (*Shakspeare*).

CONTROVE'RSIAL. *a.* (from *controversy.*) Relating to disputes; disputations (*Locke*).

CO'NTROVERSY. *s.* (*controversia*, Lat.) 1. Dispute; debate; agitation of contrary opinions (*Denham*). 2. A suit in law (*Deuteronomy*). 3. A quarrel (*Jeremiah*). 4. Opposition; enmity (*Shakspeare*).

To CO'NTROVERT. *v. a.* (*controverto*, Latin). To debate; to dispute any thing in writing (*Cheyne*).

CONTROVE'RTIBLE. *a.* (from *controvert.*) Disputable (*Brown*).

CONTROVE'RTIST. *s.* (from *controvert.*) Disputant (*Tillotson*).

CONTUMA'CIOUS. *a.* (*contumax*, Lat.) Obstinate; perverse; stubborn (*Hammond.*)

CONTUMA'CIOUSLY. *ad.* Obstinately; stubbornly; inflexibly; perversely.

CONTUMA'CIOUSNESS. *s.* (from *contumacious.*) Obstinacy; perverseness (*Wise.*).

CO'NTUMACY. *s.* (from *contumacia*, Lat.) 1. Obstinacy; perverseness; stubbornness; inflexibility (*Milton*). 2. A wilful contempt and disobedience to any lawful summons or judicial order (*Ayliffe*).

The word is used in civil as well as criminal matters; but more rarely in the first, wherein the words *default*, and *contempt*, ordinarily supply its place: the refunding of the charges of a contempt, judged at the hearing, is also the penalty of contumacy. In a criminal sense, the contumacious is condemned, not because the crime is proved on him, but because he is absent.

By the Roman laws, there was no process in case of contumacy, during the first year of absence: they only took an inventory of the goods of the fugitive, and, if he died in the year, he died *integri status*; but, after the year was expired, he was deemed culpable.

In England, contumacy is to be prosecuted to outlawry.—In France, all contumacies are annulled, if the accused make his appearance in five years: if he die in that time, his relations are permitted to purge his memory.

CONTUME'LIOUS. *a.* (*contumeliosus*, Latin.) 1. Reproachful; rude; sarcastick (*Shakspeare*). 2. Inclined to utter reproach, or practise insults; brutal; rude (*Shakspeare*). 3. Productive of reproach; shameful; ignominious (*Decay of Piety*).

CONTUME'LIOUSLY. *ad.* Reproachfully; contemptuously; rudely (*Hooker*).

CONTUME'LIOUSNESS. *s.* (from *contumelious.*) Rudeness; reproach.

CO'NTUMELY. *s.* (*contumelia*, Latin.) Rudeness; contemptuousness; bitterness of language; reproach (*Tillotson*).

To CONTU'SE. *v. a.* (*contusus*, Latin.) 1. To beat together; to bruise (*Bacon*). 2. To bruise the flesh without a breach of the continuity (*Wiseman*).

CONTU'SION. *s.* (from *contusio*, Latin.) 1. The act of beating or bruising. 2. The state of being beaten or bruised (*Boyle*). 3. A bruise. See SURGERY.

CONTY, a town of France, in the department of the Somme, and chief place of a canton, in the district of Amiens, on the Selle: four leagues S. Amiens.

CONVALE'SCENCE. CONVALE'SCENCY. *s.* (from *convalesco*, Latin.) Renewal of health; recovery from a disease (*Clarendon*).

CONVALE'SCENT. *a.* (*convalescens*, Latin.) Recovering; returning to a state of health.

CONVALL, Lily, in botany. See CONVALLARIA.

CONVALLARIA. In botany, a genus of the class hexandria, order monogynia. Corol six-cleft; calyx-less; stigma three-sided; berry superior, three-celled, spotted before it is ripe. Eleven species, scattered over the globe; of which several are natives of England. They may be sub-divided into plants,

A. with corols campanulate, and called lily of the valley.

B. corols funnel-form; called Solomon's seal.

C. corols wheel-shaped.

The elegance of these plants is well known, as also the ease with which they may be propagated by their creeping roots. See Nat. Hist. Pl. LXX.

CONVE'NABLE. *a.* (*convenable*, Fr.) 1. Consistent with; agreeable to (*Spenser*). 2. That may be convened.

To CONVE'NE. *v. n.* (*convenio*, Latin.) 1. To come together; to associate (*Boyle*). 2. To assemble for any publick purpose (*Locke*).

To CONVE'NE. *v. a.* 1. To call together; to assemble; to convoke (*Clarendon*). 2. To summon judicially (*Ayliffe*).

CONVE'NIENCE. CONVE'NIENCY. *s.* (*convenientia*, Latin.) 1. Fitness; propriety (*Hooker*). 2. Commodiousness; ease (*Calamy*). 3. Cause of ease; accommodation (*Dryden*). 4. Fitness of time or place (*Shakspeare*).

CONVE'NIENT. *a.* (*conveniens*, Latin.) Fit; suitable; proper; well adapted (*Tillotson*).

CONVE'NIENTLY. *ad.* 1. Commodiously; without difficulty (*Shakspeare*). 2. Fitly (*Wilkins*)

CONVENT, a monastery of religious, of either sex. The word comes from the Latin *conventus*, meeting; of *convenire*, to come together.

To CONVE'NT. *v. a.* (*convenio*, Latin.) To call before a judge or judicature (*Shakspeare*).

CONVENTICLE, a diminutive of convent; denoting properly a cabal, or secret assembly, of a part of the monks of a convent, to make a brigue or party in the election of an abbot. From the ill use of these assemblies the word is come into disrepute; and now stands for any mischievous, seditious, or irregular assembly. The term conventicle is said, by some, to have been first applied in England to the schools of Wickliffe; and has been since used to signify the religious assemblies of all in this country who do not conform to the established doctrine and worship of the church of England.

By 22 Car. II. cap. 1, it is enacted, that if any persons of the age of 16 years, subjects of this kingdom, shall be present at any conventicle, where there are five or more assembled, they shall be fined five shillings for the first offence, and ten shillings for the second; and persons preaching incur a penalty of twenty pounds. Also suffering a meeting to be held in a house, &c. is liable to twenty pounds penalty. Justices of the peace have power to enter such houses, and seize persons assembled, &c. and if they neglect their duty they shall forfeit one hundred pounds. And if any constable, &c. know of such meetings, and do not inform a justice of peace, or chief magistrate, &c. he shall forfeit five pounds. But the 1st Will. and Mary, cap. 18, ordains, that protestant dissenters shall be exempt from penalties: though if they meet in a house with the doors locked, barred, or bolted, such dissenters shall have no benefit from the act. Officers of the government, &c. present at any conventicle, at which there shall be ten persons, if the royal family be not prayed for in express words, shall forfeit forty pounds, and be disabled. Stat. 10 Anne, cap. 2. See NONCONFORMIST, and TOLERATION.

CONVE'NTICLER. *s.* (from *conventicle.*) One that supports or frequents private and unlawful assemblies (*Dryden*).

CONVENTION, a treaty, contract, or agreement between two or more parties.

Convention is also a name given to an extraordinary assembly of parliament, or the estates of the realm, held without the king's writ. Of this kind was the convention parliament which restored Charles II. This parliament met above a month before his return, and sat full seven months after his restoration, and enacted several laws still in force, which were confirmed by stat. 13 Car. II. c. 7. and c. 14. Such also was the convention of estates in 1688, who, upon the retreat of king James II. came to a conclusion that he had abdicated the throne, and that the right of succession devolved to king William and queen Mary; whereupon their assembly expired as a convention, and was converted into a parliament.

CONVE'NTIONAL. *a.* (from *convention.*) Stipulated; agreed on by compact (*Hale*).

CONVE'NTIONARY. *a.* (from *convention.*) Acting upon contract; settled by stipulation (*Carew*).

CONVE'NTUAL. *a.* (*conventuel*, Fr.) Belonging to a convent; monastick (*Ayliffe*).

CONVE'NTUAL. *s.* (from *convent.*) A monk; a nun; one that lives in a convent (*Shakspeare*).

To CONVE'RGE. *v. n.* (*convergo*, Latin.) To tend to one point from different places (*Newton*).

CONVE'RGENT. CONVE'RGING. *a.* (from *converge.*) Tending to one point from different places.

CONVE'RGING. (*connivens.*) In botany. Applied to the corol, when the tips of the petals meet so as to close the flower, as in trollius: to anthers, approaching or inclining towards each other, as in the class didynamia: to the sleep of plants, when two opposite leaves are so closely applied to each other by their upper surfaces, as to seem one leaf.

CONVERGING SERIES, in mathematics, series whose terms decrease the farther they proceed.

CONVERGING RAYS, in optics, those rays that, issuing from divers points of an object, incline towards another, till at last they meet and cross, and then become diverging rays. See OPTICS.

CONVE'RSABLE. *a.* (from *converse.*) Qualified for conversation; fit for company (*Addison*).

CONVE'RSABLENESS. *s.* (from *conversable.*) The quality of being a pleasing companion; fluency of talk.

CONVE'RSABLY. *ad.* (from *conversable.*) In a conversable manner.

CONVE'RSANT. *a.* (*conversant*, Fr.) 1. Acquainted with; familiar (*Hooker*). 2. Having intercourse with any (*Joshua*). 3 Relating to; concerning (*Addison*).

CONVERSA'TION. *s.* (*conversatio*, Lat.) 1. Familiar discourse; chat; easy talk (*Swift*). 2. A particular act of discoursing upon any subject. 3. Commerce; intercourse; familiarity (*Dryden*). 4. Behaviour; manner of acting in common life (*Peter*). 5. Practical habits; knowledge by long acquaintance (*Woodward*).

CONVE'RSATIVE. *a.* (from *converse.*) Relating to publick life; not contemplative.

To CONVE'RSE. *v. n.* (*converser*, Fr.) 1. To cohabit with; to hold intercouse with; to be a companion to (*Locke*). 2. To be acquainted with (*Shakspeare*). 3. To convey the thoughts reciprocally in talk (*Milton*). 4. To discourse familiarly upon any subject. 5. To have commerce with a different sex.

CO'NVERSE. *s.* (from the verb.) 1. Conversation; manner of discoursing in familiar life (*Pope*). 2. Acquaintance; cohabitation; familiarity (*Glanville*).

CONVERSE, in mathematics. One proposition is called the converse of another, when, after a conclusion is drawn from something supposed in the converse proposition, that conclusion is supposed; and then, that which in the other was supposed, is now drawn as a conclusion from it: thus, when two sides of a triangle are equal, the angles under these sides are equal; and, on the converse, if these angles are equal, the two sides are equal.

Converse propositions are not necessarily true, but require a demonstration; and Euclid always demonstrates such as he has occasion for. An instance or two will show this. If two right lined figures are so exactly of a size and form (both respecting their sides and angles) that being laid one on the other, their boundary lines do exactly coincide and agree; then no one doubts that these figures are equal. Now try the converse. If two right lined figures are equal, then if they be laid the one on the other, their boundary lines exactly coincide and agree. It is manifest that this proposition,

though the converse of the former, is by no means true. A triangle and a square may have equal areas; but it is impossible the sides of the former can all coincide with those of the latter. Again, if two triangles have their sides respectively equal, their angles will also be respectively equal, by Euc. i. 8. But, if two triangles have their angles respectively equal, it does not follow that the sides will be respectively equal: this may or may not be true, according to circumstances. Converse propositions, therefore, need a proof, notwithstanding this has been termed superfluous and impertinent by Emerson and some others.

CONVE'RSELY. *ad.* (from *converse.*) With change of order; reciprocally.

CONVE'RSION. *s.* (*conversio*, Latin.) 1. Change from one state into another; transmutation (*Arbuthnot*). 2. Change from reprobation to grace. 3. Change from one religion to another (*Acts*). 4. The interchange of terms in an argument: as, *no virtue is vice, no vice is virtue.*

CONVERSION, in a moral sense, a return from evil to good; resulting from a sense, either of the natural deformity of the one, and amiableness of the other; or of the advantages and disadvantages that spring from the one, and the other, respectively.

Or, it is a change of the heart, with regard to the morals, passions, desires, and pursuits; and of the mind, with regard to the sentiments, &c. produced by a suitable knowledge of Jesus Christ as a Saviour. See REGENERATION.

The conversion of St. Paul, considered as an argument for the truth of Christianity, is the subject of a very able treatise by lord Lyttleton.

Whether the mind be entirely passive in the first moment of its conversion, or whether there be any co-operation of our own together with the influences of divine grace upon our heart, is a question which has been very much disputed. It chiefly depends upon what is meant by conversion: if a man is then only said to be converted, when his heart is in a prevailing degree really determined for the service of God through Christ, he is plainly active in such a determination, though there may have been some preceding scenes in which he has been passive, *i. e.* while God has made those impressions on his mind which have led to this determination: and, as according to the natural constitution of our mind, some motives must precede the volition leading towards this final determination, it is proper to own God as the first mover in this blessed work, and to acknowledge that in this sense as well as others "we love him because he first loved us." Compare 1 Cor. i. 30, 31. Psal. xcv. 7, 8. Eph. iv. 30. Rev. iii. 20. Phil. ii. 13. Ezek. xi. 19. with Ezek. xviii. 31. Deut. xxx. 6. with Jer. iv. 4. Acts ii. 40. 1 Tim. iv. 16.

CONVERSION OF EQUATIONS, in algebra, is when the quantity sought, or any part or degree thereof, being in fractions, the whole is reduced to one common denomination, and then omitting the denominators, the equation is continued in the numerators only. Thus, suppose $a-b=\frac{aa+cc}{d}+h+b$; multiply all by d, and it will stand thus, $da-db=aa+cc+dh+db$.

CONVERSION OF PROPORTION, is when of four proportionals it is inferred that the 1st, is to its excess above the 2d, as the 3d, to its excess above the 4th.

CONVERSION (Centre of), in mechanics. See CENTRE OF CONVERSION.

CONVE'RSIVE. *a.* (from *converse.*) Conversable; sociable.

To CONVE'RT. *v. a.* (*converto*, Latin.) 1. To change into another substance; to transmute (*Burnet*). 2. To change from one religion to another. 3. To turn from a bad to a good life. 4. To turn toward any point (*Brown*). 5. To apply to any use; to appropriate (*Arbuthnot*).

To CONVE'RT. *v. n.* To undergo a change; to be transmuted (*Shakspeare*).

CO'NVERT. *s.* A person converted from one opinion to another (*Stillingfleet*).

CONVE'RTER. *s.* (from *convert.*) One that makes converts.

CONVERTIBI'LITY. *s* (from *convertible.*) The quality of being possible to be converted.

CONVERTIBI'LITY, in the science of what has been called *vital chemistry*, is the faculty possessed by vegetables of being converted into animal substance, so as to afford to the different organs of the animal frame the basis of homogeneous nutriment and support, or *vice versa*, the faculty possessed by animal matter of being restored to a vegetable nature so as to afford to vegetables a similar mean of augmentation and growth. We have already hinted at this power, under the articles ASSIMILATION, and ANIMALIZATION; but we have reserved ourselves to the present article to enter upon the subject in detail.

Convertibility, in this sense, is a very important branch of natural philosophy, and it has of late been treated in a very scientific manner by Mr. Good, in the course of his "Anniversary oration delivered March 8, 1808, before the Medical Society of London, on the general structure and physiology of plants compared with those of animals." In this elaborate work, the learned author first of all examines the general structure of the vegetable system; he then proceeds to point out its resemblance to the animal frame, and closes with various striking and original observations on the mutual convertibility of their organic elements. He commences with noticing the seed of the plant, which he denominates its egg; examines the structure and component parts of this vegetable egg, in what manner the root issues from one part of its central organ or corcle, and the trunk from another part—the structure of these derived organs respectively, and the means by which in several plants the one may be made interchangeably to assume the functions of the other; he unfolds the different substances of which the trunk consists; explains the process of its annual growth and signification, discusses the number and nature of the different systems of vegetable vessels, and investigates the questions

of vegetable circulation, irritability and contractility.

He proceeds to point out the parallelism and general resemblance of habit which exist between these two modifications of vascular life; deduced chiefly from their mutual necessity of sexual connexion; the similitude of the vegetable sap with the animal blood: the power existing in both of secreting from the same common current of vitality in some organs of the same individual a substance highly nutritive, in others a substance medicinal, in others poisonous, to animal life; he examines both as subject to various diseases, and often to diseases of the same orders or genera; as exfoliating their cuticle annually in certain species or genera; as being capable of resisting either extreme heat or cold in the surrounding atmosphere, and of surmounting astonishing degrees of both with the possession of life and health: he compares them as equally capable of a division into the sections of locomotive or migratory, and fixed or stationary; or as terrestrial, submarine, and aërial: upon which see the article PHYSIOLOGY.

Having sufficiently dilated upon and established these points, he proceeds as follows: "Such then is a rapid sketch of several of the more curious or more prominent resemblances that exist in the physiology of animals and vegetables. Others, and in great numbers, might be adduced; but these I trust are sufficient. And it next becomes a question, not merely of curiosity but of high moment and importance, what is the mode by which vegetable matter, possessing these and other resemblances to animal matter, is capable of being converted into animal substance so as not only to be perfectly assimilated to it, but to become the basis of animal nutriment and increase?

"Now to be able to reply succinctly and directly to this question, it is necessary first of all to inquire into the chief feature in which animal and vegetable substances agree, and the chief feature in which they disagree.

"Animals and vegetables then agree in their equal necessity of extracting a certain sweet and saccharine fluid, as the basis of their support, from whatever substances may, for this purpose, be applied to their respective organs of digestion. Animal chyle and vegetable sap have a very close approximation to each other in their constituent principles, as well as in their external appearance. In this respect plants and animals agree. They disagree, inasmuch as animal substances possess a very large proportion of azot, with a very small proportion of carbon; while vegetable substances on the contrary possess a very large proportion of carbon, with a very small proportion of azot. And it is hence obvious that vegetable matter can only be assimilated to animal by parting with its excess of carbon, and filling up its deficiency of azot *.

"Vegetable substances, then, part first of all with a considerable portion of their excess of carbon, in the stomach and intestinal canal, during the process of digestion; a certain quantity of the carbon detaching a certain quantity of the oxygen existing in these organs, as an elementary part of the air or water they contain, in consequence of its closer affinity to oxygen, and producing carbonic acid gas; a fact which has been clearly ascertained by a variety of experiments by M. Jurine of Geneva †. A very large surplus of carbon, however, still enters the animal system through the medium of the lacteals, and continues to circulate with the chyle, or the blood, till it reaches the lungs. Here again a considerable portion of carbon is perpetually parted with upon every expiration, in the same form of carbonic gass, in consequence of its union with a part of the oxyen introduced into the lungs with every returning inspiration; as is sufficiently established by the experiments of Mr. Davy, and other celebrated chemists ‡; while the excess, that yet remains, is carried off by the skin, in consequence of its contact with atmospheric air: a fact put beyond all doubt by the experiments and observations of M. Jurine, although, on a superficial view, opposed by a few experiments of Mr. Ingenhouz §; and obvious to every one from the well-known circumstance that the purest linen, upon the purest skin, in the purest atmosphere, soon becomes discoloured.

"In this way, then, and by this triple co-operation of the stomach, the lungs, and the skin, vegetable matter, in its conversion into animal, parts with the whole of its excess of carbon.

"Its deficiency of azot becomes supplied in a twofold method. First, at the lungs; also by the process of respiration; for we uniformly find, and the experiments of Dr. Priestley and Mr. Davy || are fully conclusive upon this subject, that a larger portion of azot is inhaled upon every inspiration, than is returned by every succeeding expiration; in consequence of which the portion retained in the lungs must enter into the system, in the same manner as the retained oxygen, and perhaps in conjunction with it;—while, in unison with this action of the lungs, the skin also absorbs a considerable quantity of azot, and thus completes the supply that is necessary for

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* To Halle we are indebted for the outlines of this theory, which is founded upon the discoveries of Scheele, Bergman, Lavoisier and Priestley; and owes much of its support and confirmation to the observations as well as the discoveries of Berthollet. Compare Halle's Essaie de Théorie sur l'Animalization et l'Assimilation des Alimens, in the Annales de Chimie, tom. ii. page 158, with Humboldt's Versuch einer Physischen Darstellung der Lebenskrafte, in the Physiologie Animale, tom. xlviii. In filling up this outline, however, M. Halle appears to have wandered rather too freely into the region of conjecture and mere speculation; and the system has, hence, been remodified by M. Fourcroy, and placed on a much firmer basis. It would occupy too much space to enter minutely into the difference between the two theories, and I must therefore refer the reader to the Encyclop. Method. tom. ii. art. Chimie; Paris, 1792.

† Detailed by M. Halle in his Essay just referred to.

‡ See Mr. Davy's Researches Chemical and Philosophical, &c. and Mémoire sur la Chaleur, par M. M. Lavoisier et De la Place. Mem. de l'Acad. De la Combustion, &c.

§ Essaie de Théorie sur l'Animalization et l'Assimilation des Alimens, &c. Annales de Chimie, tom. ii.

|| See Mr. Davy's Researches Chemical and Philosophical, &c. and Dr. Priestley's Experiments and Observations on different Kinds of Air, vol. iii.

the animalization of vegetable food* : evincing, hereby, a double consent of action in these two organs, and giving us some insight into the mode by which insects and worms, which are totally destitute of lungs, are capable of employing the skin as a substitute for lungs, by breathing through certain spiracles introduced into the skin for this purpose, or merely through the common pores of the skin, without any such additional mechanism. It is by this mode also that respiration takes place through the whole vegetable world, offering us another instance of resemblance to many parts of the animal; in consequence of which insects, worms, and the leaves of vegetables, equally perish, by being smeared over with oil, or any other viscous fluid that obstructs their cutaneous orifices.

"But to complete the great circle of universal action, and to preserve the important balance of nature in a state of equipoise, it is necessary, also, to inquire by what means animal matter is reconverted into vegetable; so as to afford to plants the same basis of nutriment which plants have previously afforded to animals?

"Now, this is, for the most part, obtained by the process of putrefaction, or a return of the radical elements of animal matter to their original affinities, from which they have been inflected by the superior control of the vital principle, so long as it inhabited the animal frame, and coerced into other combinations and productions†. Putrefaction is, therefore, to be regarded as a very important link in the great chain of universal life and harmony.

"The radical elements or primordia of animal matter are usually enumerated as follows: oxygen, azot or nitrogen, hydrogen, carbon; lime, iron, sulphur, soda and phosphorus. But as the last five are all compound substances, and the last four dissolve into their own primordia in the general dissolution of the animal frame, the only principles it is necessary to notice at present are the simple gasses of animal matter, and the mode of their separation.

"Of these gasses I have already observed, that nitrogen is by far the largest in respect of quantity, and it appears also to be, by far, the most active. Hence, on the cessation of the vital principle, the azotic corpuscles first make an advance towards those of oxygen, and generally in the softer and more fluid parts of the system; the control of the vital principle being here looser and less severely exerted. An union speedily takes place between the two, and thus combined they fly off in the form of nitric acid; while at the same time another portion of azot combines with some portion of hydrogen, and escapes in the form of ammonia or volatile alkali. A spontaneous decomposition having thus commenced, all the other component parts of the lifeless machine are set at liberty, and fly off either separately, or in different combinations; during which series of actions from the union of hydrogen with carbon, and especially if conjoined at the same time with some portion of elementary phosphorus or sulphur, is thrown forth that offensive aura, which is the peculiar characteristic of the putrefactive process; and which, according to the peculiar mode in which the different elementary substances combine, appears in the guise of the fetor that escapes from privies, from putrid fishes, or from rotten eggs.

"In this manner, then, by simple, binary, or ternary attractions and combinations, the whole of the substance constituting the animal system, when destitute of its vital principle, its rational and immortal spirit, flies off progressively to convey new pabulum to the world of vegetables; and nothing is left behind but lime or the earth of bones, and soil, or the earth of vegetables: the former furnishing plants with a perpetual stimulus by the eagerness with which it imbibes oxygen, and the latter offering them a food ready prepared for their digestive organs.

"In order, however, that putrefaction should take place, it is necessary that certain septics or accessories to such a process should be present, without which, putrefaction will never take place at all. Of these the chief are air, moisture, and heat.

"Air must necessarily coexist, for putrefaction can never be induced in a vacuum. Yet we must not only have air, but genuine atmospheric air; or, in other words, the surrounding medium must be compounded of the gasses which constitute the air of the atmosphere, and in their relative proportions. To prove this, it is sufficient to mention that dead animal substance has been exposed by M. Morveau ‡, and other chemists, for five or six years in confined vessels, to the action of simple nitrogen, hydrogen, carbon, and various other gasses, without any change that can be entitled to the appellation of putrefaction.

"There must, also, be moisture; for, as I have already observed, putrefaction commences in the softer and more fluid parts of the animal system. On this account it rarely takes place during a harmattan or drying wind of any kind, and never in a frost so severe as to destroy all moisture whatsoever; the power of frost exercising quite as effective a control over the elements of animal matter as the living principle itself.

"For thesame reason there must be heat; since in the total absence of heat, frost must necessarily take place, together with a perfect privation of moisture. On this last account, again, the heat made use of must only be to a certain extent §; for, if carried much higher, the rarefaction which takes place in the surrounding at-

* M. Jurine is chiefly entitled to the honour of this discovery; his experiments coincide with several of Dr. Priestley's results, and have been since confirmed by other experiments of MM. Lavoisier and Fourcroy. See Premier Mémoire sur la Transpiration des Animaux, par A. Seguin et Lavoisier, 1792; and compare with M. Hassenfratz's Mémoire sur la Combinaison de l'Oxygene, &c. Acad. des Scien. 1791.

† It should hence appear that putrefaction is the only positive criterion of death, or the total cessation of the principle of life. Galvanism has, indeed, been advanced as a positive proof of the same by Behrends and Creve: but Humboldt has sufficiently shown its insecurity as an infallible test.

‡ See Mémoire sur la Nature des Fluides élastiques aëriformes, qui se dégagent de quelques Matières animales, &c. par M. Lavoisier, Mem. de l'Acad. 1782; as also, M. Brugnatelli's paper in Crell's Chemical Annals for 1708, Über die Faulung thierischer theile in verschieden Luftarten.

§ About 65° of Fahrenheit is the degree usually found most conducive to putrefaction.

mosphere will induce an ascent of all the fluids in the animal substance towards its surface; whence they will fly off in the form of vapour, before the putrefying process can have had time to commence, and leave nothing behind but dry indurated fibres, incapable of putrefaction because destitute of all moisture. Our dinner tables too often supply us with instances of this fact, in presenting to us dishes of roast or boiled meat too long exposed to the action of the fire;—and hence, reduced to juiceless and ragged fibres totally devoid of nutriment, and capable of keeping for weeks or months, without betraying any putrefactive indication.

"In like manner when bodies are buried beneath the hot and arid sands of Egypt or Arabia, with a vertical sun shining almost without ceasing upon the sandy surface, the heat hereby engendered is so considerable as to raise the whole of the fluids of the animal system to the skin, whence they are immediately and voraciously drunk up by the bibulous sands that surround it; or, piercing their pores, are thrown off into the atmosphere in the form of insensible vapour. In consequence of which, when a body thus buried is dug up a few weeks after its interment, instead of being converted into its original elements, it is found changed into a natural mummy, altogether as hard and as capable of preservation as any artificial mummy, prepared with the costliest septics employed on such occasions.

"When dead animal organs are deposited in situations in which only a very small portion of atmospheric air is capable of having access to them, a change indeed takes place, but of a very different description from that of putrefaction, and which is altogether of a most curious and extraordinary nature. For, in such cases, the animal organs, instead of being converted into their original elements, will be transmuted into fat, wax, or spermaceti: or rather into a substance *sui generis*, and partaking a middle nature between that of the two former, whence the French chemists have given it the appellation of *adipocire*; a term not strictly classical, but for which the chemists of our own country have not hitherto substituted any other.

"This result is observed, not unfrequently, in bodies that are drowned, and rendered incapable of rising to the surface of the water; for in such a situation but very little air, and consequently very little oxygen, can reach them from the external atmosphere. It was observed also in 1786 and 1787, on opening the *fosses communes*, or common burial caverns in the churchyard of the Innocents at Paris, for the purpose of laying the foundation of a new pile of buildings: for the bodies that on this occasion were dug up, instead of having dissolved into their elementary corpuscles, were found for the most part converted into this very substance of waxy-fat or adipocire. The populace were alarmed at the phænomenon, and the chemists were applied to for an explanation. M. Fourcroy, among others, attended upon this occasion; and his solution, which will apply to all cases of a similar kind, referred the whole to the extreme difficulty with which external air obtained any communication with the inhumed bodies, in consequence of the close adaptation of coffin to coffin, and the compactness with which every cavity was filled up. Difficult however as this communication must have been, he conceived that, from the natural elasticity of atmospheric air, some small portion of it must still have entered, conveying perhaps just oxygen enough to excite the new action of decomposition. This having commenced, the constituent oxygen of the dead animal organs would itself be progressively disengaged, and rapaciously laid hold of by all the other constituent principles, from their strong and general affinity to it. During this gradual evolution, there can be little doubt that the greatest part of it would be seized by the predominant azot, a very considerable part by the carbon, and the rest by the hydrogen; and the result would be, upon the total but very slow escape of the constituent and disengaged oxygen, that the whole or nearly the whole of the azot, a considerable portion of the carbon, and a certain quantity of the hydrogen, would have escaped also—leaving behind the remainder of the carbon and the hydrogen, now incapable of escape from the want of oxygen to give wings to their flight, together with the residual earth of the animal machine.

"But hydrogen and carbon, though in this case incapable of sublimation from the want of oxygen, would still, from their mutual attraction and juxta-position, enter into a new union and produce a new result, and this result must necessarily be fat; for fat is nothing else than a combination, in given proportions, of carbon and hydrogen. And hence, whatever the respective animal organs of the bodies deposited in these burial caverns may have antecedently consisted of, whether muscle, ligament, tendon, skin, or cellular substance, when thus deprived of their oxygen and azot, the whole must uniformly and of necessity be converted into fat. Pure and genuine fat it would have been, provided there had been nothing left behind but mere carbon and hydrogen; but as we can scarcely conceive that every corpuscle of the azot could be carried off before the total escape of the oxygen, many parts of it must necessarily have assumed a flaky, soapy, or waxy appearance, from the union of the azot left behind with some portion of the hydrogen, and the consequent production of ammonia or volatile alkali; since, by an intermixture of alkali with fat, every one knows that soap or a saponaceous substance is uniformly produced.

"But excepting in situations of this kind, in reality, in every situation in which dead animal matter, destitute of its spiritus intus, its divine and immortal principle, is exposed to the usual auxiliaries of putrefaction, putrefaction will necessarily ensue, and the balance will be fairly maintained:—the common elements of vital organization will be set at liberty to commence a new career, and the animal world will restore to the vegetable the whole which it has antecedently derived from it.

"In this manner is it, then, that nature, or rather that the God of nature is for ever unfolding that simple but beautiful round of action, that circulus æterni motûs, as Beccher has elegantly expressed it, by which every system is made to contribute to the well-being of every system, every part to the harmony and happiness of the whole: establishing his perfections, confounding infidelity, and overpowering us, whenever we contemplate it as we ought, with the sublimest emotions of gratitude, adoration, and love."

CONVE'RTIBLE. *a.* (from *convert.*) 1. Susceptible of change; transmutable (*Arbuth-*

not). 2. So much alike as that one may be used for the other (*Swift*).

CONVE'RTIBLY. *ad.* (from *convertible.*) Reciprocally (*South*).

CONVE'RTITE. *s.* (*converti*, French.) A convert: not in use (*Donne*).

CO'NVEX. *a.* (*convexus*, Latin.) Rising in a spherical form; opposite to concave.

CONVEX LEAF. (*folium convexum.*) In botany, rising towards the centre; or, with the edge more contracted than the disk, so that the disk is raised.

This term is sometimes opposed to depressed, and has reference to the substance of a leaf; at others, it refers to the mode of its expansion, and is opposed to concave. It is applied also to the receptacle, which rises towards the middle: as in tansy, chrysanthemum, matricaria, buphthalmum.

Co'nvex. *s.* A convex body (*Tickel*).

CONVE'XED. *particip. a.* (from *convex.*) Protuberant in a circular form (*Brown*).

CONVE'XEDLY. *ad.* (from *convex.*) In a convex form (*Brown*).

CONVE'XITY. *s.* (from *convex.*) Protuberance in a circular form (*Newton*).

CONVEXITY, the exterior surface of a convex, *i. e.* gibbous and globular thing; in opposition to concavity, or the inner surface, which is hollow or depressed. A convex mirror represents its images smaller than the objects; as a concave one represents them larger: a convex mirror reflects the rays from it, diverging; and therefore disperses and weakens their effect: as a concave one reflects them converging; so as they concur in a point, and have their effect increased: and by how much the mirror is a portion of a smaller sphere, by so much does it diminish the objects, and disperse the rays the more. (See MIRROR.) A convex lens is either convex on both sides, called a convexo-convex; or it is plain on one side and convex on the other, called a plano-convex; or concave on one side and convex on the other, called a convexo-concave, or concavo-convex, as the one or the other surface prevails; *i. e.* as this or that is a portion of a smaller sphere.

CONVE'XLY. *ad.* (from *convex.*) In a convex form (*Grew*).

CONVE'XNESS. *s.* (from *convex.*) Spheroidical protuberance; convexity.

CONVEXO-CONCAVE. *a.* Having the hollow on the inside, corresponding to the external protuberance (*Newton*).

To CONVE'Y. *v. a.* (*conveho*, Latin.) 1. To carry; to transport from one place to another (*Kings*). 2. To hand from one to another (*Locke*). 3. To remove secretly (*Shakspeare*). 4. To bring; to transmit (*Locke*). 5. To transfer; to deliver to another (*Spenser*) 6. To impart; to introduce (*Locke*). 7. To manage with privacy (*Shakspeare*).

CONVE'YANCE. *s.* (from *convey.*) 1. The act of removing any thing (*Shakspeare*). 2. Way for carriage or transportation (*Raleigh*). 3 The method of removing secretly from one place to another (*Shakspeare*). 4. The means or instrument by which any thing is conveyed (*Shakspeare*). 5. Delivery from one to another (*Locke*). 6. Act of transferring property (*Spenser*). 7. Writing by which property is transferred (*Clarendon*). 8. Secret management; juggling artifice (*Shakspeare*).

CONVE'YANCER. *s.* (from *conveyance.*) A lawyer who draws writings by which property is transferred.

CONVE'YER. *s.* (from *convey*). One who carries or transmits any thing (*Brerewood*).

To CONVI'CT. *v. n.* (*convinco*, Latin.) 1. To prove guilty; to detect in guilt (*Bacon*). 2. To confute; to discover to be false (*Brown*). 3. To show by proof or evidence (*Hooker*).

Convi'ct. *a.* Convicted; detected in guilt.

Convi'ct. *s.* (from the verb.) A person cast at the bar (*Ayliffe*).

CONVI'CTION. *s.* (from *convict.*) 1. Detection of guilt (*Cowell*). 2. The act of convincing; confutation (*Atterbury*). 3. State of being convinced (*Swift*).

CONVICTION, in law. When a jury has given a verdict upon trial, finding the prisoner guilty, he is said to be convicted of the crime whereof he stands indicted. (See TRIAL.) When the offender is thus convicted, there are two collateral circumstances that immediately arise. 1. On a conviction in general for any felony, the reasonable expences of prosecution are by statute 25 Geo. II. c. 36. to be allowed the prosecutor out of the county-stock, if he petitions the judge for that purpose; and by statute 27 Geo. II. c. 3. poor persons, bound over to give evidence, are likewise entitled to be paid their charges, as well without conviction as with it. 2. On a conviction of larceny in particular, the prosecutor shall have restitution of his goods by virtue of the statute 21 Hen. VIII. c. 11. It is now usual for the court, upon the conviction of a felon, to order, without any writ, immediate restitution of such goods as are brought into court, to be made to the several prosecutors. Or else, secondly, without such writ of restitution, the party may peaceably retake his goods wherever he happens to find them, unless a new property be fairly acquired therein. Or, lastly, if the felon be convicted and pardoned, or be allowed his clergy, the party robbed may bring his action of trover against him for his goods, and recover a satisfaction in damages. But such action lies not before prosecution; for so felonies would be made up and healed: and also recaption is unlawful, if it be done with intention to smother and compound the larceny; it then becoming the heinous offence of theft-bote.

It is not uncommon, when a person is convicted of a misdemeanour, which principally and more immediately affects some individual, as a battery, imprisonment, or the like, for the court to permit the defendant to speak with the prosecutor, before any judgment is pronounced; and if the prosecutor declares himself satisfied, to inflict but a trivial punishment. This is done to reimburse the prosecutor his expences, and make him some pri-

vate amends, without the trouble and circuity of a civil action.

CONVI'CTIVE. *a.* (from *convict.*) Having the power of convincing.

To CONVI'NCE. *v. a.* (*convinco*, Latin.) 1. To force another to acknowledge a contested position (*Tillotson*). 2. To convict; to prove guilty of (*Raleigh*). 3. To evince; to prove (*Shakspeare*). 4. To overpower; to surmount (*Shakspeare*).

CONVI'NCEMENT. *s.* (from *convince.*) Conviction (*Decay of Piety*).

CONVI'NCIBLE. *a.* (from *convince.*) 1. Capable of conviction. 2. Capable of being evidently disproved (*Brown*).

CONVI'NCINGLY. *ad.* (from *convince.*) In such a manner as to leave no room for doubt; so as to produce conviction (*Atter.*).

CONVI'NCINGNESS. *s.* (from *convincing.*) The power of convincing.

To CONVI'VE. *v. a.* (*convivo*, Latin.) To entertain; to feast (*Shakspeare*).

CONVI'VAL. CONVI'VIAL. *a.* (*convivalis*, Latin.) Relating to an entertainment; festal; social (*Denham*).

CONU'NDRUM. *s.* A low jest; a quibble.

To CO'NVOCATE. *v. n.* (*convoco*, Lat.) To call together; to summon to an assembly.

CONVOCA'TION. *s.* (*convocatio*, Lat.) 1 The act of calling to an assembly (*Sidney*). 2. An assembly (*Leviticus*).

CONVOCATION, an assembly of the clergy of England, by their representatives, to consult of ecclesiastical matters. It is held during the session of parliament, and consists of an upper and a lower house. In the upper sit the bishops, and in the lower the inferior clergy, who are represented by their proctors, consisting of all the deans and archdeacons, of one proctor for every chapter, and two for the clergy of every diocese, in all one hundred and forty-three divines, viz. twenty-two deans, fifty-three archdeacons, twenty-four prebendaries, and fourty-four proctors of the diocesan clergy. The lower house chooses its prolocutor, whose business it is to take care that the members attend, to collect their debates and votes, and to carry their resolutions to the upper house. The convocation is summoned by the king's writ, directed to the archbishop of each province, requiring him to summon all bishops, deans, archdeacons, &c.

The power of the convocation is limited by a statute of Henry VIII. They are not to make any canons or ecclesiastical laws without the king's licence; nor when permitted to make any, can they put them in execution but under several restrictions. They have the examining and censuring all heretical and schismatical books and persons, &c. but there lies an appeal to the king in chancery, or to his delegates. The clergy in convocation, and their servants, have the same privileges as members of parliament. See PARLIAMENT.

To CONVO'KE. *v. a.* (*convoco*, Latin.) To call together; to summon to an assembly (*Pope*).

To CONVO'LVE. *v. a.* (*convolvo*, Latin.) To roll together; to roll one part upon another (*Milton*).

CONVOLU'TED. *part.* Twisted; rolled upon itself (*Woodward*).

CONVOLU'TED LEAF. (*convolutus*.) In botany, a term in vernation or foliation, signifying that the sides of the nascent leaves are rolled together like a scroll: as in arum, piper, solidago, brassica, prunus, gramina or grasses.—This is applied also, in the same sense, to the petals and stigmas, as in crocus.—Tendril (cirrus), twisted into rings or spirals.

CONVOLU'TION. *s.* (*convolutio*, Latin.) 1. The act of rolling any thing upon itself; the state of being rolled upon itself (*Grew*). 2. The state of rolling together in company (*Thomson*).

CONVOLVULUS. Bind-weed. In botany, a genus of the class pentandria, order monogynia. Corol campanulate, plaited; stigmas two; capsule two or three-celled, the cells two-seeded. A hundred and twenty species distributed over the four quarters of the globe: of which the following are chiefly worth noticing.

1. C. sepium with arrow-shaped leaves, the lobes acute; flowers generally solitary, of a white or purplish hue; a troublesome weed in the gardens, and found wild in our hedges. In the dispensatories it was formerly denominated convolvulus major albus, the larger, white bindweed, and is violently purgative and given in dropsical affections. A poultice of the herb, mixed with oil, is recommended in white swellings of the knee joint.

2. C. scammonia; with arrow-shaped leaves, truncate behind; peduncles round, two or three-flowered of a pale yellow, succeeded by roundish seed-vessels three-seeded, and filled with seeds. The branches of the plant, slender and trailing on the ground, extending on every side to the distance of ten or twelve feet. The concrete juice of the root is the scammony of the shops. It is a native of Syria. See the article SCAMMONIUM.

3. C. purpureus. Purple bindweed. With heart-shaped, divided leaves; fruit drooping; pedicles thickened. A native of America with white, red, or purple flowers; and annual stems about eight or ten feet high.

4. C. nil. Blue bindweed; also an American plant, not quite so high as c. purpureus. Leaves heart-shaped, three-lobed; corols half five cleft; peduncles shorter than the petiole, bearing two flowers of a deep blue or indigo-colour; whence the name of nil or indigo. It is a beautiful plant, and flowers all the latter part of the summer.

5. C. turpethum. Turpeth-plant or turpeth bindweed. A native of Ceylon, with heart-shaped, angular leaves; stem with four membranaceous angles; peduncles many-flowered. The roots shoot forth twining branches, which cling round any kind of prop they may meet with; and when broken they discharge a white viscous juice that soon hardens into a resinous substance. See TURPETHUM.

6. C. jalapa. Jalap-bindweed. A native of Mexico, with twining herbaceous stem, rising eight or ten feet high from a root, that when bruised, discharges, like the preceding, a viscous, milky juice. Leaves ovate, somewhat heart-shaped, obtuse, obscurely repand, villous underneath: peduncles one-flowered, resembling those of the common greater bindweed. The powdered root is the jalap of the shops. See JALAPIUM.

About half the species have a prostrate, or untwining stem, of which the soldanella, or brassica marina, as it is termed in the dispensatories, furnishes an example. This is found on the sandy shores of our own country, with kidney-form leaves; peduncles one-flowered, having membranous angles.

Most of the species, whether twining or prostrate, may be propagated with care in our own country, either from seeds or layers, except the turbeth and jalap bindweeds, which are too tender for this purpose. Those with twining stems should be furnished with props, or planted in the vicinity of trees whose stems they may climb around, as they require such support.

To CONVO'Y. *v. a.* (*convoyer*, French.) To accompany by land or sea, for the sake of defence.

CO'NVOY. *s.* (from the verb.) 1. Force attending on the road by way of defence (*South*). 2. The act of attending as a defence (*Shakspeare*).

CONVOY, in naval affairs, one or more ships of war, employed to accompany and protect merchant ships, and prevent their being insulted by pirates, or the enemies of the state in time of war.

CONVOY, in military matters, a body of men that guard any supply of men, money, ammunition, or provision, conveyed by land into a town, army, or the like, in time of war.

CO'NUS. Cone. In zoology, a genus of the class vermes, order testacea. Animal a limax; shell univalve, convolute, turbinate; aperture effuse, longitudinal, linear, without teeth, entire at the base; pillar smooth. Eighty-one species; found in Asia, Africa, and America; rarely in Europe: they may be thus subdivided.

A. Spire or turban nearly truncate.

B. Pyriform, with a rounded base; the cylinder half as long again as the spire.

C. Elongated and rounded at the base: the cylinder as long again as the spire.

D. Ventricose in the middle and contracted at each end. Two of the most beautiful are,

1. C. nobilis. Shell subcylindrical, smooth, glabrous, and finely polished, yellow or brown with sometimes an olive shade, spotted with white, and marked with very finely punctured transverse striæ. The natural resort of this elegant worm unknown: the shell is often met with in cabinets.

2. C. tulipa. Shell oblong, gibbous, smooth; aperture gaping: without tubercles; white with occasional blueish, brown, yellow or red clouds, and painted with chesnut interrupted lines; base obsoletely striate obliquely: spire acute, smooth, spotted, with very fine transverse striæ.

CO'NUSANCE. *s.* (*conoissance*, French.) Cognisance; notice.

To CONVU'LSE. *v. a.* (*convulsus*, Latin.) To give an irregular and involuntary motion to the parts of any body (*Thomson*).

CONVU'LSION. *s.* (*convulsio*, Latin.) 1. An involuntary contraction of the fibres and muscles, whereby the body and limbs are preternaturally distorted (*Quincy*). 2. Any irregular and violent motion; tumult; commotion (*Temple*).

CONVULSION. (*convulsio.*) In medicine. Clonic spasm. A diseased action of muscular fibres, known by alternative relaxations, with violent and involuntary contractions of the muscular parts, without sleep. Cullen arranges convulsion in the class neuroses, and order spasmi. Convulsions are universal or partial, and have obtained different names according to the parts affected or symptoms; as the risus sardonicus, when the muscles of the face are affected; St. Vitus's dance, when the muscles of the arm are thrown into involuntary motions, with lameness and rotations. The hysteric epilepsy, or other epilepsies, arising from different causes, are convulsive diseases of the universal kind: the muscles of the globe of the eye, throwing the eye into involuntary distortions in defiance to the direction of the will, are instances of partial convulsion. The muscles principally affected in all species of convulsions are those immediately under the direction of the will; as those of the eyelids, eye, face, jaws, neck, superior and inferior extremities. The muscles of respiration, acting both voluntarily and involuntarily, are not unfrequently convulsed; as the diaphragm, intercostals, &c. The more immediate causes of convulsions are, 1. Either mental affection, or any irritating cause exciting a greater action in the arterial system of the brain and nerves. 2. An increase of nervous energy, which seems to hold pace or be equi-potent with the increased arterial energy excited in the brain. 3. This increased energy, conveying its augmented effects, without the direction of the will, to any muscles destined to voluntary motion, over-irritates them. 4. The muscles, irritated by the increased nervous energy and arterial influx, contract more forcibly and involuntarily by their excited vis insita, conjointly with other causes, as long as the increased nervous energy continues. 5. This increased energy in the nervous system may be excited either by the mind, or by any acrimony in the blood, or other stimuli sufficiently irritating to increase the arterial carbon, nervous influence, and the vires insitæ of muscles. 6. After muscles have been once accustomed to act involuntarily, and with increased action, the same causes can readily produce the same effects on those organs. 7. All parts that have muscular fibres may be convulsed. 8. The sensations in the mind most capable of producing convulsions are, timidity,

horror, anger, great sensibility of the soul, &c.

CONVU'LSIVE. *a.* (*convulsif*, French.) That gives twitches or spasms (*Hale*).

CONWAY, a market town of Caernarvonshire, in North Wales. Lat. 53. 20 N. Lon. 4. 1 W.

CO'NY. *s.* (*connil*, French.) A rabbit; an animal that burrows in the ground (*Ben Jonson*).

CONYBEARE (John), an eminent English bishop. He was born at Pinhoe, in Devonshire, in 1692, and educated at Exeter college, Oxford, where he took his degrees, obtained a fellowship, and in 1730 he was chosen rector. In 1732 he published an answer to Tindal's Christianity as old as the Creation, for which he was rewarded the same year with the deanery of Christ church, Oxford. In 1750 he was made bishop of Bristol, and died in 1755. His remains were interred in Bristol cathedral. Two volumes of excellent sermons by the bishop were published after his death.

To CO'NYCATCH. *v. n.* To cheat; to trick: a cant word (*Shakspeare*).

CONYZA. Flea-bane. In botany, a genus of the class syngenesia, order polygamia superflua. Receptacle naked; down simple, rough: calyx imbricate roundish; florets of the ray three-cleft. Ninety-one species—scattered over the four quarters of the globe; of which one or two are of our own country. They may be subdivided into

A. Herbaceous; the leaves not decurrent.

B. Shrubby; the leaves not decurrent.

C. Shrubby and herbaceous; stem winged.

CONZA, an ancient archiepiscopal town of Naples, in Italy. Lat. 40. 50 N. Lon. 15. 35 E.

To COO. *v. n.* (from the sound.) To cry as a dove or pigeon (*Thomson*).

COOCH-BAHAR, a district of Bahar, in the province of Bengal, separated from that of Rungpore, by the river Durlap.

COOK. *s.* (*coquus*, Latin.) One whose profession is to dress and prepare victuals for the table (*Shakspeare*).

Cook (James), a celebrated navigator. He was born at Marton in Cleveland, Yorkshire, in 1728. His father was a cottager, and hind to a gentleman. At the age of 17 he was bound apprentice to a grocer at Snaith, but having a strong propensity to the sea, his master gave up his indentures, and in 1746 he bound himself to Mr. Walker, a ship-owner of Whitby. In 1752 he was appointed mate of a ship in the coal trade, belonging to the same merchant, but shortly after he left that service for the navy. In 1760 he obtained a lieutenant's commission, and distinguished himself greatly in America and the West Indies. So much, indeed, had he improved himself in astronomy and mathematics, that when it was determined in 1767 to send out persons to Otaheite, to observe the transit of Venus, he was chosen to command the vessel, and made captain. He hoisted his pendant on board the Endeavour, May 25, 1768, and was accompanied in the voyage by sir Joseph, then Mr. Banks, and Dr. Solander. This voyage took up nearly three years, and so great was the commander's reputation increased by his skill and conduct in it, that he was pitched upon to make another voyage to complete the discovery of the southern hemisphere. He sailed with two ships, the Resolution and Adventure, April 9, 1772, and arrived at the Cape of Good Hope, October 30. From the 22d of November till the 17th of January following, they continued cruising with a view to discover the supposed southern continent, but were obliged to give up the object, after running the greatest risk from the immense fields of ice which cover those seas. The ships returned to England, after making several discoveries of islands, July 14, 1774, having lost but one man during this long voyage. It was now resolved upon to make a trial for discovering a north-west passage, and captain Cook readily undertook the arduous task. He sailed on this last expedition in July, 1776, and a few months after his departure the Royal Society voted him their gold medal, in return for the account which he had sent them of the means by which he preserved the health of his crew. He never had the pleasure of receiving this honourable mark of esteem, for while the nation was anxiously waiting to hear of his successs, news arrived by way of Kamtschatka of his having fallen in a skirmish with the inhabitants of Owhyhee, February 14, 1779. His body was treated in the most brutal manner by the enraged savages, but some of the remains were afterwards delivered up, and committed to the deep with the most affecting solemnity. Captain Cook left a widow and several children: on each of the latter his majesty settled a pension of 25l. a year, and on the widow 200l.

Captain Cook was a man of a plain address and appearance, but well looking, and upwards of six feet high. His head was small, and he wore his hair, which was brown, tied behind. His face was full of expression; his nose exceedingly well shaped; his eyes, which were small and of a brown cast, were quick and piercing; his eye-brows prominent, which gave his countenance altogether an air of austerity. Notwithstanding this, it was impossible for any one to excel him in humanity, as is evident from the whole tenour of his behaviour both to his own people and the many savage nations with whom he had occasion to interfere. This amiable property discovered itself even in the final catastrophe of his life; his utmost care being directed to the preserservation of his people, and the procuring them a safe retreat to their boats. And it cannot be enough lamented, that he who took so much care of others, should have perished in such a miserable manner for want of being properly supported by them. The perseverance with which he pursued every object which happened to be pointed out as his duty, was unequalled. Nothing ever could divert him from what he had once undertaken; and he persevered in the midst of dangers and difficulties which would have disheartened per-

sons of very considerable strength and firmness of mind. For this he was adapted by nature, having a strong constitution, inured to labour; and capable of undergoing the greatest hardships. His stomach bore without difficulty the coarsest and most ungrateful food; and he submitted to every kind of self-denial with the greatest indifference. To this strength of constitution he joined an invincible fortitude of mind, of which the circumnavigation of New Holland, and his voyage towards the south pole, furnish innumerable instances. He was master of himself on every trying occasion; and the greater the emergency, the greater always appeared his calmness and recollection; so that in the most dangerous situations, after giving proper directions to his people, he could sleep soundly the hours that he had allotted to himself. That he possessed genius in an eminent degree cannot be questioned: his invention was ready, and capable not only of suggesting the most noble objects of pursuit, but the most proper methods of attaining them. His knowledge of his own profession was unequalled; and to this he added a very considerable proficiency in other sciences. In astronomy he became so eminent, that he was at length enabled to take the lead in making the astronomical observations during the course of his voyages. In general learning he likewise attained to such a proficiency as to be able to express himself with clearness and propriety; and thus became respectable as the narrator as well as the performer of great actions. He was an excellent husband and father, sincere and steady in his friendship, and possessed of a general sobriety and virtue of character. In conversation he was unaffected and unassuming; rather backward in urging discourse, but obliging and communicative to those who wished for information; and he was distinguished by a simplicity of manners almost universally the attendant of truly great men. With all these amiable qualities, the captain was occasionally subject to an hastiness of temper, which has been set forth in its utmost extent, if not exaggerated by some, though but few, who are not his friends: but even these, as well as others, when taking a general view of his character, are obliged to acknowledge that he was undoubtedly one of the greatest men of his age.

From the numerous poetical tributes offered to the memory of captain Cook, by our elegant female writers, we must confine ourselves to a single extract from Miss Hannah More's poem on Slavery.

—Had those advent'rous spirits who explore
Thro' ocean's trackless waste, the far-sought shore,
Whether of wealth insatiate, or of power,
Conquerors who waste, or ruffians who devour:
Had these possess'd, O Cook! thy gentle mind,
Thy love of arts, thy love of human-kind;
Had these pursu'd thy mild and liberal plan,
Discoverers had not been a curse to man!
Then, bless'd Philanthropy! thy social hands
Had link'd dissever'd worlds in brother's bands;
Careless, if colour, or if clime divide;
Then, lov'd and loving, man had liv'd and died.

For a more full and satisfactory account of the voyages and discoveries of this most celebrated navigator, we refer to the article COOK in the English Encyclopædia. Or, those who have much leisure will employ it properly in reading the account of the first voyage written by Dr. Hawksworth, and of the second written by the Captain himself, in a style at once clear, natural, and manly.

COOK, in ichthyology. See LABRUS.

COOK'S RIVER, a river of North America, which runs into the Northern Pacific Ocean, between Cape Elizabeth and Point Banks, that is, between Lon. 207. 9. and 207. 45 E. Greenwich: Lat. 58. 42. and 59. 10 N. Captain Cook sailed up this river seventy leagues, as far as Lon. 210 E. and Lat. 61. 30 N. without finding any appearance of its source.

COOK'S STRAIT, a strait in the Southern Pacific Ocean, which divides the two islands of New Zealand. The islands thus divided lie between the latitudes of 34 and 48 S.; and between the longitudes of 181 and 194 W.

COOK-MAID. *s.* (*cook* and *maid.*) A maid that dresses provisions (*Addison*).

COOK-ROOM. *s.* A room in which provisions are prepared for the ship's crew.

To COOK. *v. a.* (*coquo*, Latin.) 1. To prepare victuals for the table (*Decay of Piety*). 2. To appear for any purpose (*Shakspeare*).

CO'OKERY. *s.* (from *cook.*) The art of dressing victuals (*Davies*).

COO'KIA. In botany, a genus of the class decandria, monogynia. Calyx five-cleft, inferior; corol five-petalled, equal, inferior; pome five-celled; the cells one-seeded. One species only: a native of China. A warty tree, with leaves uncommonly pinnate; leaflets ovate, pointed, entire, narrower on the inside; panicle vast, terminate.

COOKING, the art of dressing or preparing food. It is effected by various methods, of which boiling is the most common, but also the most objectionable: as it deprives flesh of its nutritious juice. A better mode of dressing animal food is roasting, by which its strength is less dissipated; because a crust is soon formed on its surface, that more effectually preserves the nutritive particles from evaporation. Hence, one pound of roasted meat is, in real nourishment, equal to double that quantity of boiled animal food.

Many substances, though naturally possessed of salubrious qualities, are rendered unwholesome by the refinements of cookery. By compounding several incongruous ingredients, to produce a poignant sauce, or rich soup, the cook frequently forms compositions that are almost poisonous. Thus, high seasoning of every kind, pickles, and the like, merely stimulate the palate, and cannot fail to injure the stomach. Hence, the plainest dishes are uniformly the most conducive to health, while they are most easily digested. This self-

evident proposition is acknowledged by every reflecting person, but gives the least satisfaction to the epicure, who consults his taste, before he appeals to his warped understanding.

Animal food is generally boiled in half-open vessels, instead of which, close utensils only ought to be employed for that purpose. We therefore preferably recommend the process called stewing; as it is not only the most wholesome mode of dressing meat, but at the same time well adapted to retain and concentrate the most substantial parts of animal food. There are many ingenious contrivances to facilitate and regulate this process, under the name of pneumatic kitchens, portable kitchens, &c. which are now well known, and much used; and therefore need not be described here.

COOL. *a.* (*koelen*, Dutch.) 1. Somewhat cold; approaching to cold (*Temple*). 2. Not zealous; not ardent; not fond.

COOL. *s.* Freedom from heat; soft and refreshing coldness (*Addison*).

To COOL. *v. a.* (*koelen*, Dutch.) 1. To make cool; to allay heat (*Arbuthnot*). 2. To quiet passion; to calm anger (*Swift.*)

To COOL. *v. n.* 1. To grow less hot. 2. To grow less warm with regard to passion or inclination (*Dryden*).

CO'OLER. *s.* (from *cool.*) 1. That which has the power of cooling the body (*Harvey*). 2. A vessel in which any thing is made cool.

COOLING MEDICINES. See REFRIGERANTS.

CO'OLLY. *ad.* (from *cool.*) 1. Without heat, or sharp cold (*Thomson*). 2. Without passion (*Atterbury*).

CO'OLNESS. *s.* (from *cool.*) 1. Gentle cold; a soft or mild degree of cold (*Bacon*). 2. Want of affection; disinclination (*Clarendon*). 3. Freedom from passion.

COOM. *s.* (*ecume*, French.) 1. Soot that gathers over an oven's mouth (*Phillips*). 2. That matter that works out of the wheels of carriages (*Bailey*).

COOMB. *s.* A measure of corn containing four bushels (*Bailey*).

COOP. *s.* (*kuype*, Dutch.) 1. A barrel; a vessel for the preservation of liquids. 2. A cage; a pen for animals, as poultry or sheep (*Brown*).

To COOP. *v. a.* (from the noun.) To shut up in a narrow compass; to cage (*Dryden*).

COOPE'E. *s.* (*coupé*, French.) A motion in dancing.

CO'OPER. *s.* (from *coop.*) One that makes coops or barrels (*Child*).

In the Encyclopedie Methodique there is a long and verbose account of the tools or instruments employed by the cooper; of the kinds of timber proper for the different kinds of casks; of the methods of preparing the wood for its various purposes; of the manner in which he ought to hold the plane when dressing the staves; and of the time when it is proper to put the staves together, or, in other words, to mount the cask. From this detail we shall extract such particulars as appear to us to be least generally known, though perhaps of no great importance in themselves.

Notwithstanding the antiquity of the art of cask-building, there are some countries in which even now it is wholly unknown; and others where, though it is sufficiently known, yet, from the scarcity of wood, or some other cause, earthen vessels, and skins lined with pitch, are preferred to wooden barrels for the holding and transporting of liquors. The Latin word *dolium*, which we translate a cask, was employed by the Romans to denote earthen vessels used for this purpose; though the word *dolare*, from which it is derived, applies very well to our casks, which are composed of several pieces of wood hewn from the same tree, and fitted by planes before they be joined together. We are indeed certain that casks of the same kind with our own were in use among the Romans before the Christian era; for both Varro and Columella, in treating of the rural economy of their days, speak of vessels formed of several staves of wood bound together by circles or hoops. The merit of having invented such vessels is given by Pliny to certain people who lived at the foot of the Alps, and who in his days lined their casks with pitch.

At what period the fabrication of casks was introduced into Britain is unknown to us; though it is probable that we derived the art from the French, who might have it from the Romans.

We need hardly inform any of our readers, that a cask has the appearance of two truncated cones joined at their bases, or that the part where the junction appears to be made being the most capacious, or that of which the diameter is the largest, is vulgarly called the belly of the cask. These cones, however, were they completed, would not be regular, but rather conoids, being formed of pieces of timber, or staves, which are not straight lines as in the cone, but are curved from the vertex to the base.

In choosing this wood, if he can have a choice, the cooper prefers old and thick and straight trees, from which he hews thin planks to be formed into staves; and in France, where this art is practised on a large scale, the winter months are allotted for the preparation of the staves and bottoms, and the summer for putting them together, or mounting the cask. The author of the article in the Encyclopedie Methodique directs the cooper, when dressing the staves with a plane, to cut the wood always across; a practice which we doubt not is proper, though we think it would not be easy to assign the reason of it. Planing is the most laborious and difficult part of the work; and there are but few coopers who plane quickly, and at the same time well. In shops where the work is distributed into parts, planing is reckoned a great object; and in France, before the revolution, a good planer gained from three shillings and threepence sterling to four shillings and three farthings a-day.

In forming the staves, it must never be forgotten that each is to constitute part of a double conoid; that it must therefore be broadest at the middle, becoming gradually, though not in straight lines, narrower towards the extremities; that the outside across the wood must be

wrought into the segment of a circle, and that the stave must be thickest near the middle, growing thinner, by very gentle degrees, towards the ends. To adjust accurately these different curves (for even the narrowing of the staves must be in a curve) to the size and intended shape of the cask, would require either great experience, or a larger portion of mathematical science than we have reason to think that many coopers possess. With respect to the inside of the stave, it is of little consequence whether it be rounded into the segment of a circle or not, and therefore the cooper very seldom takes that trouble.

The staves being all dressed and ready to be arranged in a circular form, it might be thought necessary, in order to make the seams tight, to trim the thin edges, which are to be joined together, in such a manner as that a ray passing from the outside of the cask through a seam to the centre, should touch the contiguous staves from the exterior to the interior side; in other words, that the thin edges should be sloped as the archstones of a bridge are sloped, so that the contiguous staves may be brought into firm contact throughout the whole joint. This, however, is not the practice of the cooper. With great propriety he brings the contiguous staves into contact at their inner surfaces only; so that by driving the hoops hard, he can make the joints much closer than he could possibly have done had the edges of the staves been so sloped as to permit them to touch each other throughout before being drove together by the compression of the hoops. This, together with giving to the staves the proper curvature, seems to be the only part of the cooper's work which deserves the name of art; for the driving of the hoops and the forming of the bottoms could certainly be accomplished by any carpenter, we had almost said by any man, though he had never seen a hoop driven or a bottom formed. The timber generally employed for the casks is oak, and that for the hoops ash or hazel, excepting where iron is used instead of wood.

COOPER (Anthony Ashley), first earl of Shaftesbury, a most able statesman, was the first son of sir John Cooper, bart. of Rockburn in Hampshire, and was born in 1621. He was elected member for Tewkesbury, at 19 years of age, in the short parliament that met April 13, 1640. He seems to have been well affected to the king's service at the beginning of the civil wars; for he repaired to the king at Oxford with offers of assistance: but prince Maurice violating his pledge to a town in Dorsetshire that he had got to receive him, furnished him with a pretence for going over to the parliament, from whom he accepted a commission. When Richard Cromwell was deposed, and the Rump came again into power, they nominated sir Anthony of their council of state, and a commissioner for managing the army. At that very time he had engaged in a secret correspondence for restoring Charles II. and, upon the king's coming over, was sworn of his privy council. He was one of the commissioners for the trial of the regicides; was soon after made chancellor of the Exchequer, then a commissioner of the treasury; in 1672 he was created earl of Shaftesbury; and soon after raised to the rank of lord chancellor. He filled this office with great ability and integrity; and though the short time he was at the helm was in a tempestuous season, it is doing him justice to say, nothing could either distract or affright him. The great seal was taken from him in 1673, twelve months after he received it; but, though out of office, he still made a distinguished figure in parliament, for it was not in his nature to remain inactive. He drew upon himself the implacable hatred of the Duke of York, by steadily promoting, if not originally inventing, the famous project of an exclusion-bill. When his enemies came into power, he found it necessary to consult his safety, by retiring into Holland, where he died six weeks after his arrival in 1683. He was a man of strong parts, but licentious; and Charles II. once said to him, "I believe, Shaftesbury, thou art the wickedest fellow in my dominions;" to which his lordship gravely replied, "May it please your majesty, for a subject, I believe I am;" at which the king laughed heartily: though it would have been more becoming, and not disgraceful even to this king, supposing he had a soul, had he burst into a flood of tears.

COOPER (Anthony Ashley), earl of Shaftesbury, the grandson of the above, born in 1671. He was educated under the inspection of his grandfather, and then went on his travels. In 1693 he was elected member of the house of commons for Poole, but when that parliament was dissolved, he declined being a candidate again, owing to the weakness of his constitution. He then went to Holland, where he pursued his studies under a borrowed name, and contracted a close intimacy with Bayle, Le Clerc, and other learned men. Shortly after his return to England he succeeded to the family title, but rarely attended the house of lords. In 1704, the French prophets occasioned so much disturbance, that steps were proposed for suppressing them, which occasioned his lordship, who was a great enemy to persecution, to write his letter concerning Enthusiasm. In 1709 appeared his Moralists, a philosophical rhapsody. The year following he married, and in 1711 set out for Italy. He died at Naples in 1713. His lordship left one son. The complete edition of his Characteristics which appeared immediately after his death, comprizes all that he intended for the press; but in 1716, came out his Letters written to a young Man at the University; and in 1721, Toland published Letters from the earl of Shaftesbury to Robert Molesworth, esq. This lord Shaftesbury shews himself in all his works a zealous advocate for liberty, and as steady a friend to virtue as can, we believe, be found among the believers in natural religion: he sometimes professed himself a Christian, but many parts of his writings render his faith in the divine mission of Christ very questionable.

COOPER'S TOWN, is situated on the Susquehannah, a river of North America. In the vicinity of this town a large boiling house,

for the purpose of refining maple sugar, was erected in the winter of 1792, under the direction of William Cooper, esq. the father of the noble and successful enterprise for supplying the United States with American sugar.

CO'OPERAGE. *s.* (from *cooper.*) The price paid for cooper's work.

To COO'PERATE. *v. n.* (*con* and *opera*, Latin.) 1. To labour jointly with another to the same end (*Bacon. Boyle*). 2. To concur in producing the same effect.

COOPERA'TION. *s.* (from *cooperate.*) The act of contributing or concurring to the same end (*Bacon*).

COO'PERATIVE. *a.* (from *cooperate.*) Promoting the same end jointly.

COOPERA'TOR. *s.* (from *cooperate.*) He that, by joint endeavours, promotes the same end with others.

COOPTA'TION. *s.* (*coopto*, Latin.) Adoption; assumption.

COO'RDINATE. *a.* (*con* and *ordinatus*, Latin.) Holding the same rank (*Watts*).

COO'RDINATELY. *ad.* In the same rank; without subordination.

COO'RDINATENESS. *s.* (from *coordinate.*) The state of being coordinate.

COORDINATES, in the higher geometry, are the fixed lines intersecting each other in a given angle, that are assumed as measures or as means for determining the equation and various properties of a curve. Thus, in fig. 14. Pl. 47. AC and AS are co-ordinates, of which, as is usual, one of them AC is the axe of the abscissas, and the other AS is parallel to the ordinates or applicates PM. When the angle A is a right angle, then the co-ordinates are called rectangular. The point A is named the origin of the coordinates. Among the various methods which have been adopted to ascertain the properties of curves, the most usual is to search into the relation which, in virtue of the law, according to which the point M supposed to describe an individual curve moves, must exist between the distances from that point to the two axes or co-ordinates. Yet this method of referring the curve we wish to examine to two fixed axes, is not exclusive; for frequently it is more advantageous to choose other fixed objects to serve as terms of comparison. Thus, we sometimes assume two fixed points for terms of comparison, and we ascertain the relation which in virtue of the law according to which the describing point moves, must constantly exist between the two distances from that point and the two fixed points: sometimes, we enquire into the relation existing between the distance from the describing point to a fixed point, and from the describing point to a fixed line: at others the relation subsisting between the distance of this describing point from a fixed point or pole, and the angle which that distance makes with a fixed line: the variables assumed in these, or many other manners, may be termed in general co-ordinates. It has already been seen (articles CARDIOID and CONCHOID), and will farther appear in the treatise on CURVES, that much is often gained in point of simplicity by a judicious assumption of the co-ordinates employed in an investigation.

COORDINA'TION. *s.* (from *coordinate.*) The state of holding the same rank; collateralness (*Howel*).

COOS, an island in the Archipelago, subject to the Turks. Lat. 37. 1 N. Lon. 27. 44 E.

COOT, in ornithology. See FULICA.

COP. *s.* (*kop*, Dutch.) The head; the top of any thing.

COPAIVA BALSAM. See BALSAMUM COPAIVÆ.

COPAL. (*copal*, the American name of all clear odoriferous gums). Gum copal. This resinous substance is imported from Guinea, where it is found in the sand on the shore. It is of a yellow colour, faintly glistening, imperfectly transparent, and apt to break with a conchoidal fracture. It is tasteless, and, while cold, inodorous. It is used dissolved in rectified spirits of wine or other volatile solvents both as a varnish, and an astringent medicine. In North America the natives obtain a very considerable quantity of this resin from the rhus copallinum, but it is of an inferior quality to that brought from Guinea and Spanish America: and which is supposed to be a secretion from the elæocarpus copalliferus. See ELÆOCARPUS.

The specific gravity of copal varies from 1·045 to 1·139. Mr. Hatchett found it soluble in alkalies and nitric acid with the usual phenomena.

Copal varnish used by the English japanners is made as follows. Four parts by weight of copal in powder are put into a glass matrass and melted. The liquid is kept boiling till the fumes, condensed upon the point of a tube thrust into the matrass, drop to the bottom of the liquid without occasioning any hissing noise as water does. This is a proof that all the water is dissipated, and the copal has been long enough melted. One part of boiling hot linseed oil (previously boiled in a retort without any litharge) is now poured into it, and well mixed. The matrass is then taken off the fire, and the liquid, while still hot, is mixed with about its own weight of oil of turpentine. The varnish thus made is transparent, but it has a tint of yellow, which the japanners endeavour to conceal by giving the white ground on which they apply it a shade of blue. It is with this varnish that the dial plates of clocks are covered after having been painted white.

A correspondent in the 17th vol. of the Transactions for the Encouragement of Arts, &c. informs us, that copal may be dissolved in spirit of turpentine by the following process: Having prepared a glass vessel, of sufficient capacity to contain at least four times the quantity intended to be dissolved, and which should be high in proportion to its breadth, reduce two ounces of copal to small pieces, and put them into the vessel. Mix a pint of spirit of turpentine with one-eighth of spirit of sal ammoniac; shake them well together; pour them on the powder, cork the glass, and tie it over with a string or wire, making a small hole

through the cork. Set the glass in a sand heat, so regulated as to make the contents boil as quickly as possible, but so gently that the bubbles may be counted as they ascend from the bottom. The same heat must be kept up exactly till the solution is complete. It requires the most accurate attention to succeed in this operation; for, if the heat abate, or the spirits boil quicker than is directed, the solution will be impeded, and it will afterwards be in vain to proceed with the same materials; but, if properly managed, the spirit of sal ammoniac will be seen gradually to descend from the mixture, and attack the copal, which swells and dissolves, except a very small quantity. It is of much consequence that the vessel should not be opened till some time after the liquid has become perfectly cold; as it frequently happens that the whole of the contents are blown with violence against the cieling.—The spirit of turpentine should be of the best quality.

Mr. Sheldrake has lately favoured the public with another and easier method of dissolving copal. This method is as follows: Provide a strong vessel made of tin or other metal: it should be shaped like a wine bottle, and capable of holding two quarts; it will be convenient to have a handle strongly rivetted to the neck; the neck should be long and have a cork fitted to the mouth, but a notch or small hole should be made in the cork, that, when the spirit is expanded by heat, a small portion may force its way through the hole, and thus prevent the vessel from bursting. Dissolve half an ounce of camphor in a quart of spirit of turpentine, and put it into the vessel; take a piece of copal the size of a large walnut, reduce it to a coarse powder or very small pieces, put them into the tin bottle, fasten the cork down with a wire, and set it, as quick as possible, upon a fire so brisk as to make the spirit boil almost immediately; then keep it boiling very gently for about an hour, when so much of the copal will be dissolved as will make a very good varnish; or, if the operation has been properly begun, but enough of copal has not been dissolved, it may be again put on the fire, and by boiling it slowly for a longer time, it may be at last brought to the consistence desired. See farther Tingry's Painter's and Varnisher's Guide.

Copal-tree. See Elæocarpus.

COPA'RCENARY. *s.* (from *coparcener.*) Joint succession to any inheritance (*Hale*).

COPA'RCENER. *s.* (from *con* and *particeps*, Latin.) *Coparceners* are such as have equal portion in the inheritance of the ancestor (*Cowley*).

COPA'RCENY. *s.* An equal share of coparceners (*Philips*).

COPA'RTNER. *s.* (*co* and *partner.*) One that has a share in some common stock or affair; one equally concerned (*Milton*).

COPA'RTNERSHIP. *s.* (from *copartner.*) The state of bearing an equal part, or possessing an equal share (*Hale*).

CO'PATAIN. *a.* (from *cop.*) High raised; pointed (*Hanmer*).

COPE, is the name of an ancient tribute of 6*d.* per load due to the lord of the soil out of some of the Derbyshire lead mines.

Cope. *s.* (See Cop.) 1. Any thing with which the head is covered. 2. A sacerdotal cloak, or vestment worn in sacred ministration. 3. Any thing which is spread over the head.

To Cope. *v. a.* (from the noun.) 1. To cover, as with a cope (*Addison*). 2. To contend with; to oppose (*Shakspeare*). 3. To reward; to give in return (*Shakspeare*).

To Cope. *v. n.* 1. To contend; to struggle; to strive (*Watts*). 2. To interchange kindness or sentiment (*Shakspeare*).

COPENHAGEN, the capital of Denmark, with a university. It is the best built city of the North; for, although Petersburgh excels it in superb edifices, yet, as Copenhagen contains no wooden houses, it does not display that striking contrast of meanness and magnificence, but exhibits a more uniform appearance. It owes its principal beauty to a dreadful fire in 1728, that destroyed five churches and 67 streets, which have been since rebuilt in the modern style. The new part of the town, raised by Frederic V. is very beautiful: it consists of an octagon, containing four uniform and elegant buildings of hewn stone, and of four broad streets leading to it in opposite directions. In the middle of the area is an equestrian statue of the king in bronze, as big as life. It was cast by Saly, at the expence of the East India Company, and cost 80,000l. sterling. The streets are well paved, with a footway on each, but narrow and inconvenient for general use. The greatest part of the buildings are of brick; and a few are of freestone. The palaces of the nobility are in general splendid, and ornamented in the Italian stile of architecture. The palace erected by Christian VI. is a large structure; but its external appearance is more grand than elegant. The haven is always crowded with ships; and the streets are intersected by broad canals, which bring the merchandise close to the warehouses that line the quays. The citadel is a regular fortification, with five bastions, a double ditch full of water, and several advanced works. The city is about five miles in circumference, and is seated on the E. shore of the isle of Zealand, 300 miles S.W. of Stockholm, and 500 N.E. of London. Lon. 12. 36 E. Lat. 55. 41 N.

COPERNICAN SYSTEM, is that system of the world, in which it is supposed that the sun is at rest in the centre, and the earth and planets all moving around him in their own orbits. See Pl. 19.

Here it is supposed, that the heavens and stars are at rest; and the diurnal motion which they appear to have, from east to west, is imputed to the earth's diurnal motion from west to east.

This system was maintained by many of the ancients; particularly Ecphantus, Seleucus, Aristarchus, Philolaus, Cleanthes Samius, Nicetas, Heraclides Ponticus, Plato, and Pythagoras: from the last of whom it was anciently called the Pythagoric, or Pythagorean System.

This system was also held by Archimedes, in

his book of the number of the Grains of Sand; but after him it became neglected, and even forgotten, for many ages; till Copernicus revived it; from whom it took the new name of the Copernican System.

In this system none of the celestial bodies shine with their own native light, but only the sun; so that all the planets both primary and secondary are opaque bodies, that have no other light but what they receive from the sun, and reflect it back towards the earth and other places. This is evident from the moon: for only that side of her is observed to shine which is directly opposed to the sun; but the other side which is from the sun is quite dark, except so far as it is illuminated by reflection from the earth; for the more of the illuminated side that is turned towards the earth, the more we see her enlightened, the rest being dark; and the more of her dark side that is turned towards the earth, the more of her appears dark. Thus at the full she appears all enlightened, and at the change all dark. The like phenomena are observed in Mercury and Venus, which shew all the phases of the moon, according to their various situations; and sometimes appear like a black spot upon the body of the sun. Mars likewise appears gibbous when near the quadratures with the sun. The satellites of Jupiter are eclipsed when they are behind his body, being then immersed in his shadow; they likewise cast their shadows upon the body of Jupiter. And in Saturn the shadow of the ring upon his body proves his opacity. And the weakness of the light of those that are far distant from the sun, shews that it is not innate but borrowed.

All the planetary bodies are nearly spherical, and all of them have a rotation round their axis. These motions are found by means of certain spots upon their surfaces, which give us the time of their rotation. In some planets, for the want of such marks, the times of their rotation have not yet been found. That they are spherical bodies appears from the slow motion of the spots near the edges, and their swifter motion near the middle. Likewise the line separating the illuminated part from the dark is always elliptical, which proves their figure to be spherical. See PLANET, and ASTRONOMY.

COPERNICUS (Nicolaus), an eminent astronomer, was born at Thorn in Prussia, Jan. 10, 1472. He was taught the Latin and Greek languages at home; and afterwards sent to Cracovia, where he studied philosophy and physic. His genius in the mean time was naturally turned to mathematics, which he pursued through all its various branches. He set out for Italy when he was 23 years of age; but staid at Bohemia some time, for the sake of being with the celebrated astronomer of that place, Dominicus Maria; whose conversation, however, and company, he affected, not so much as a learner, as an assistant to him in making his observations. From thence he passed to Rome, where he was no sooner arrived than he was considered as not inferior to the famous Regiomontanus; and acquired in short so great a reputation, that he was chosen professor of mathematics, which he taught for a long time with great applause. He also made some astronomical observations there about the year 1500. Returning to his own country some years after, he began to apply his vast knowledge in mathematics to correct the system of astronomy which then prevailed. He set himself to collect all the books which had been written by philosophers and astronomers, and to examine all the various hypotheses they had invented for the solution of the celestial phenomena; to try if a more symmetrical order and constitution of the parts of the world could not be discovered; of all the hypotheses of the ancients none pleased him so well as the Pythagorean, which made the sun the centre of the system, and supposed the earth to move not only round the sun but round its own axis also. After much profound contemplation, and many careful calculations, he removed the obscurities of this old system, and, in fact, much improved it. His discoveries and improvements he comprised in a book, the publication of which he prudently suppressed, till he had a powerful patron, pope Paul III. a lover of astronomy, to protect him. Alluding to the admonition of the poet, he tells the pontiff, "he had suffered that fruit of his labours to ripen, not nine years only, but four times nine." At length he committed the care of the impression to two friends, Schoner and Osiander, in a distant city. The work was printed in 1543, under the title of Revolutionibus Orbium Cœlestium, and the author received a copy of it a few hours before his death, on the 24th of May 1543, he being then 70 years of age.

Few works have destroyed more riveted errors, or established more important truths, than this great work of Copernicus. His noble theory (see COPERNICAN SYSTEM) was at first coldly received, or utterly rejected: but the labours of future astronomers at length obtained it a complete triumph. Copernicus was also the first who demonstrated the double orbit of the moon; her menstrual motion about the earth, and her annual about the sun. Nor did this great man stop here; for, after laying a solid foundation of the celestial physics, he began the superstructure, by surmising a principle of attraction to be inherent in all matter. Copernicus also wrote a tract on Trigonometry; and has exhibited tokens of the versatility of his talents, as it is acknowledged that he had considerable skill as a painter, and was extremely well acquainted with the Latin and Greek languages.

COPERNICUS, the name of an astronomical instrument, invented by Whiston, to shew the motion and phenomena of the planets, both primary and secondary. It is founded upon the Copernican system, and therefore called by his name.

COPHENES, in ancient geography, a river of India, probably the same which is now called Cow.

COPHOS. (Κωφος, dumb). In medicine. Deaf or dumb: also a dulness in any of the senses.

COPHOSIS. (*cophosis*, κωφωσις; from κωφος, deaf). A difficulty of hearing. It is often symptomatic of some disease. See DYSECOEA.

COPHTI, COPHTS, or COPTI, a name given to the Christians of Egypt, who are of the sect of Jacobites. The critics are extremely divided about the origin and orthography of the word; some write it Cophti, others Cophtites, Cophitæ, Copts, &c. P. Sollier, a jesuit, derives the word from *Jacobite*, retrenching the first syllable; whence, Cobite, Cobea, Copta, and Cophta.

The Cophts have a patriarch who resides at Cairo, but he takes his title from Alexandria: he has no archbishop under him, but 11 or 12 bishops. The rest of the clergy, whether secular or regular, is composed of the orders of St. Anthony, St. Paul, and St. Macarius, who have each their monasteries. Besides the orders of priests, deacons, and subdeacons, the Cophts have likewise archimandrites, the dignity whereof they confer with all the prayers and ceremonies of a strict ordination. This makes a considerable difference among the priests; and besides the rank and authority it gives them with regard to the religious, it comprehends the degree and functions of arch-priests. By a custom of 600 years standing, if a priest elected bishop be not already archimandrite, that dignity must be conferred on him before episcopal ordination. The second person among the clergy, after the patriarch, is the titular patriarch of Jerusalem, who also resides at Cairo, because of the Cophts of Jerusalem; he is, in effect, little more than the bishop of Cairo: only he goes to Jerusalem every Easter, and visits some other places in Palestine near Egypt, which own his jurisdiction. To him belongs the government of the Cophtic church, during the vacancy of the patriarchal see.

To be elected patriarch, it is necessary the person have lived all his life in continence: it is he confers the bishoprics. To be elected bishop, the person must be a celibate; or, if he has been married, it must not be above once. The priests and inferior ministers are allowed to be married before ordination; but are not obliged to it, as Ludolphus erroneously observes. They have a great number of deacons, and even confer the dignity frequently on children.

F. Roderic reduces the errors and opinions of the Cophts to the following heads: 1. That they put away their wives, and espouse others while the first are living. 2. That they have seven sacraments, viz. baptism, the eucharist, confirmation, ordination, faith, fasting and prayer. 3. That they deny the Holy Spirit to proceed from the son. 4. That they only allow of three œcumenical councils; that of Nice, Constantinople, and Ephesus. 5. That they only allow of one nature, will, and operation, in Jesus Christ, after the union of the humanity with the divinity. For their errors in discipline, they may be reduced, 1. To the practice of circumcising their children before baptism, which has obtained among them from the 12th century. 2. To their ordaining deacons at five years of age. 3. To their allowing of marriage in the second degree. 4. To their forbearing to eat blood: to which some add their belief of a baptism by fire, which they confer by applying a hot iron to their forehead or cheeks. For farther particulars, consult Savary's Letters on Egypt, vol. ii. and Browne's Travels in Africa.

COPHTIC, or COPTIC (corrupted from Goptic, Gyptic, Ægyptic): the language of the Copts, or descendants of the ancient Egyptians, who employed both a different language and character from the Coptic tribes. A very curious specimen of both, together with the Greek translation, is to be found on the Egyptian monument captured from the French at Alexandria, by the English army under general Hutchinson, and preserved in the British Museum. The Coptic characters and many of the words have a very near resemblance to Greek; the characters it is written in being all Greek. It has a form and construction peculiar to itself: it has no inflections of the nouns or verbs; but expresses number, case, gender, person, mood, tense, and possessive pronouns, by letters and particles prefixed.

F. Kircher is the first who published a grammar, and vocabulary of the Cophtic. There is not known any book extant in the Cophtic, except translations of the Holy Scriptures, or of ecclesiastical offices; or others that have relation thereto, as dictionaries, &c.

The ancient Cophtic is now no longer found but in books; the language now used throughout the country is Arabic.

The old Cophtic, which Kircher maintains to be a mother-tongue, and independent of all others, had been much altered by the Greek: for besides that it has borrowed all its characters from the Greek, with a very little variation, a great number of the words are pure Greek.

Vossius, indeed, asserts, that there was no Cophtic language till after Egypt became subject to the Arabs. The language, according to him, is a mixture of Greek and Arabic: the very name thereof not being in the world till after the Arabs were masters of the country. But this, M. Simon observes, proves nothing; except that what wa sanciently called Egyptian has since by the Arabs been called Cophtic, by a corruption of speech. There are, it is true, Arabic words in the Cophtic; yet this by no means proves but that there was a language before that time, either Cophtic or Egyptian. Pietro de la Valle observes, that the Cophts have entirely lost their ancient tongue; that it is now no longer understood among them; that they have nothing extant therein but some sacred books; and that they still say mass in it.

COPHTIC LITURGIES, are three; one attributed to Basil, another to St. Gregory, and the third to Cyril: they are translated into Arabic for the use of the priests and people.

COPIA LIBELLI DELIBERANDA, a writ which lies in case where a man cannot get the copy of a libel at the hands of the ecclesiastical judge.

COPIATA, under the western empire, a grave-digger. In the first ages of the church, there were clerks destined for this employment.

In the year 357, Constantine made a law in favour of the priests *copiatæ*, i. e. of those who had the care of interments; whereby he exempts them from the lustral contribution which all other traders paid. It was under him also that they first began to be called *copiatæ*, q. d. clerks destined for bodily labour, from κοπος, of κοπω, *scindo*, *cædo*, *ferio*, I cut, beat, &c.

CO'PIER. *s.* (from *copy.*) 1. One that copies; a transcriber (*Addison*). 2. A plagiary; an imitator (*Tickel*).

COPING OF A WALL, the top or cover of a wall, made sloping to carry off the water.

CO'PIOUS. *a.* (*copia*, Latin.) 1. Plentiful; abundant; exuberant (*Thomson*). 2. Abounding in words or images; not barren; not concise (*Milton*).

CO'PIOUSLY. *ad.* (from *copious.*) 1. Plentifully; abundantly; in great quantities. 2. At large; without brevity or conciseness; diffusely (*Addison*).

CO'PIOUSNESS. *s.* (from *copious.*) 1. Plenty; abundance; great quantity. 2. Diffusion; exuberance of style (*Dryden*).

CO'PIST. *s.* (from *copy.*) A copier; a transcriber; an imitator.

CO'PLAND. *s.* A piece of ground which terminates with an acute angle.

CO'PPED. *a.* (from *cop.*) Rising to a top or head (*Wiseman*).

COPPEL. See CUPPELL.

COPPELLING. See CUPPELLATION.

COPPER (*cuprum*), a metal of a pale red colour with a tinge of yellow. For its different forms, combinations, and uses, see CUPRUM.

COPPER PYRITES. See CUPRUM.

COPPER PLATES. See ENGRAVING.

COPPER PLATE PRINTING. See PRINTING.

CO'PPER. *s.* A vessel made of copper; a boiler larger than a moveable pot (*Bacon*).

COPPERSNOSE. *s.* (*copper* and *nose.*) A red nose (*Wiseman*).

COPPER-WORK. *s.* A place where copper is worked or manufactured.

COPPERAS, a term synonymous with *vitriol*, implying a salt which in early chemistry was supposed to be formed from copper alone, or at least far more frequently than from any other metal. It is now, however, well known to be obtained with almost equal ease from copper, iron, and zinc, and in commerce and manufactures, is distinguished into blue copperas when obtained from the first, green when from the second, and white when from the third. Copperas is the sulphat or metallic salt of these metals, produced by a solution of them in sulphuric acid, and a subsequent crystallization of the compound.

Yet when not distinguished by any of the above adjuncts of colour, the term copperas is always supposed to imply sulphat or copperas of iron, or as it is at other times denominated green vitriol.

This salt was known to the ancients, and is mentioned by Pliny under the names of *misy*, *sory*, and *calcanthum* (lxxxiv. cap. 12.). The usual mode of obtaining it is by moistening iron pyrites which are found native in abundance, and exposing them to the open air. They are slowly covered with a crust of sulphat of iron which is dissolved in water, and afterwards obtained in crystals by evaporation. The salt is sometimes found ready formed either in a state of solution in water, or mixed with decayed pyrites. In some cases it is found necessary to roast the pyrites before they can be made to undergo spontaneous decomposition. Pyrite is in fact a supersulphuret of iron. The roasting reduces it to the state of sulphuret, which decomposes very readily. The solution always contains an excess of acid, whence it is necessary in order to obtain the salt in crystals, to throw into it a quantity of old iron.

Sulphat of iron has a very fine green colour. Its crystals are transparent rhomboidal prisms. It has a very strong styptic taste, and always reddens vegetable blues. Its specific gravity is 1·8399. It is soluble in about two parts of cold water and three-fourths of its weight of boiling water. It is insoluble in alkohol. When exposed to the air its surface gradually becomes opaque, and is covered with a yellow powder; because it absorbs oxygen, and is partially converted into oxysulphat.

When heated it melts, gradually loses its water of crystallization, and by a strong heat sulphuric acid is driven off, and there remains behind a red powder, formerly known by the name of *colcothar* of vitriol, which is either a mixture of red oxyd of iron and oxysulphat or pure oxyd, according to the heat applied.

Sulphat of iron is decomposed by the alkaline phosphats and borats, and by the greater number of those salts whose base forms an insoluble compound with the sulphuric acid, as nitrat of silver, of lead, of baryte, &c.

This salt is the basis of many dyes. It gives a fine black, though it weakens the fibres of the material unless used with great caution, the least excess occasioning the cloth, &c. to rot very soon. Wool is more affected by this injurious property than skins or felt, as is obvious, from the greater duration of hats dyed black than of broad-cloths. Ink owes its rich blackness principally to the copperas it contains; and our fine black leathers are equally indebted to its powerful qualities, which so firmly fix the colour on all occasions.

CO'PPERSMITH. *s.* (*copper* and *smith.*) One that manufactures copper (*Swift*).

CO'PPERWORM. *s.* 1. A little worm in ships. 2. A worm breeding in one's hand (*Ainsworth*).

CO'PPERY. *a.* (from *copper.*) Containing copper; made of copper (*Woodward*).

CO'PPICE. *s.* (*coupeaux*, French.) A low wood cut at stated times for fuel; a place overrun with brushwood (*Mortimer*).

CO'PPLE-DUST. *s.* (or *coppel dust.*) Powder used in purifying metals (*Bacon*).

COPPLE-STONES, are fragments of stone, broke from the adjacent cliffs, rounded by being bowled and tumbled to and again by the action of the water (*Woodward*).

CO'PPLED. *a.* (from *cop.*) Rising in a conic form (*Woodward*).

COPROSMA. In botany, a genus of the class polygamia, order monoecia. Calyx one-leaved, five-toothed; coral five or six-cleft; stamens from five to seven. Herm: styles two, long; berry two-seeded; seeds flat on one side, concave on the other. Two species only; natives of New Zealand; one of them a very fetid shrub.

COPSE, *s.* (abridged from *coppice.*) A place overgrown with short wood (*Waller*).

To COPSE. *v. a.* (from the noun). To preserve underwood (*Swift*).

COPTIS, in botany. See HELLEBORUS.

COPTOS, in ancient geography, now Kepht, a city of Upper Egypt, three miles distant from the Nile, and connected with it by a navigable canal.

CO'PULA. *s.* (Latin.) The word which unites the subject and predicate of a proposition: as, *books* are *dear* (*Watts*).

To CO'PULATE. *v. a.* (*copulo*, Lat.) To unite; to conjoin (*Bacon*).

To CO'PULATE. *v. n.* To come together as different sexes (*Wiseman*)

COPULA'TION. *s.* (from *copulate.*) The congress or embrace of the two sexes (*Hooker*).

CO'PULATIVE. *a.* (*copulativus*, Lat.) A term of grammar. *Copulative* prepositions are those which have more subjects: as, *riches* and *honours are temptations to pride.*

CO'PY. *s.* (*copie*, French.) 1. A transcript from the archetype or original (*Denham*). 2. An individual book: as, *a good or fair* copy (*Hooker*). 3. The autograph; the original; the archetype (*Holder*). 4. An instrument by which any conveyance is made in law (*Shak.*). 5. A picture drawn from another picture.

The following process for taking a copy of a recent M.S. was communicated to the Philomathic Society at Paris, by M. Charles Coquebert. It consists in putting a little sugar in common writing ink, and with this the writing is made on common paper; and when a copy is required, unsized paper is taken and lightly moistened with a sponge. The wet paper is then applied to the writing, and a flat iron of a moderate heat being lightly passed over the unsized paper, the copy is immediately produced. The use of the sugar is to prevent the ink from drying too soon.

CO'PY-BOOK. *s.* (*copy* and *book.*) A book in which copies are written for learners to imitate.

COPY-HOLD, a tenure for which a tenant has nothing to show but the copy of the rolls made by the steward of the lord's court. It is called a base tenure; because the tenant holds the land at the will of the lord. However, it is not simply at the will of the lord, but according to the custom of the manor by which such estate is descendible, and the tenant's heirs may inherit it; and a copy-holder, so long as he does his services, and does not break the custom, cannot be ejected by the lord; or if he be, he shall have trespass against him. See the articles TENURE and VILLENAGE.

COPY-HOLDER, one who is admitted tenant of lands or tenements within a manor, which time out of mind, by use and custom of the manor, have been demisable, and demised to such as will take them in fee-simple or fee-tail, for life, years, or at will, according to the custom of the manor by copy of court-roll; but is generally where the tenant has such estate either in fee or for three lives.

COPY-RIGHT, the right which an author may be supposed to have in his own original literary compositions; so that no other person, without his leave, may publish or make profit of the copies. When a man by the exertion of his rational powers has produced an original work, he has clearly a right to dispose of that identical work as he pleases; and any attempt to take it from him, or vary the disposition he has made of it, is an invasion of his right of property. Now the identity of a literary composition consists entirely in the sentiment and the language; the same conceptions, clothed in the same words, must necessarily be the same composition: and whatever method be taken of conveying that composition to the ear, or to the eye of another, by recital, by writing, or by printing, in any number of copies, or at any period of time, it is always the identical work of the author which is so conveyed; and no other man (it has been thought) can have a right to convey or transfer it without his consent, either tacitly or expressly given. This consent may perhaps be tacitly given when an author permits his work to be published without any reserve of right, and without stamping on it any marks of ownership; it is then a present to the public, like the building of a church, or the laying out a new highway: but in case of a bargain for a single impression, or a total sale or gift of the copy-right; in the one case the reversion hath been thought to continue in the original proprietor; in the other the whole property, with its exclusive rights, to be perpetually transferred to the grantee. On the other hand, it is urged, that though the exclusive right of the manuscript, and all which it contains, belongs undoubtedly to the owner before it is printed or published; yet, from the instant of publication, the exclusive right of an author or his assigns to the sole communication of his ideas immediately vanishes and evaporates, as being a right of too subtile and unsubstantial a nature to become the subject of property at the common law, and only capable of being guarded by positive statute and special provisions of the magistrate.

The Roman law adjudged, that if one man wrote any thing, though ever so elegantly, on the paper or parchment of another, the writing should belong to the original owner of the materials on which it was written: meaning certainly nothing more thereby than the mere mechanical operation of writing, for which it directed the scribe to receive a satisfaction; especially as, in works of genius and invention, such as a picture painted on another man's canvas, the same law gave the canvas to the painter. We find no other mention in the law of any property in the works of the understanding, though the sale of literary copies, for the purpose of recital or multiplica-

tion, is certainly as ancient as the times of Terence, Martial, and Statius. Neither with us in Britain hath there been (till very lately) any final determination upon the right of authors at the common law. It was determined in the case of *Miller* v. *Taylor* in *B. R. Pasch.* 9 Geo. III. 1769, that an exclusive copy-right in authors subsisted by the common law. But afterwards, in the case of *Donaldson* v. *Becket*, before the house of lords, which was finally determined 22d February, 1774, it was held, that no copy-right subsists in authors after the expiration of the several terms created by the statute 8 Ann, c. 19. This statute declares, that the author and his assigns shall have the whole liberty of printing and reprinting his works for the term of 14 years, and no longer; and also protects that property by additional penalties and forfeitures; directing farther, that, if at the end of that term the author himself be living, the right shall then return to him for another term of the same duration. See LITERARY PROPERTY.

To CO'PY. *v. a.* 1. To transcribe; to write after an original (*Pope*). 2. To imitate; to propose to imitation (*Swift*).

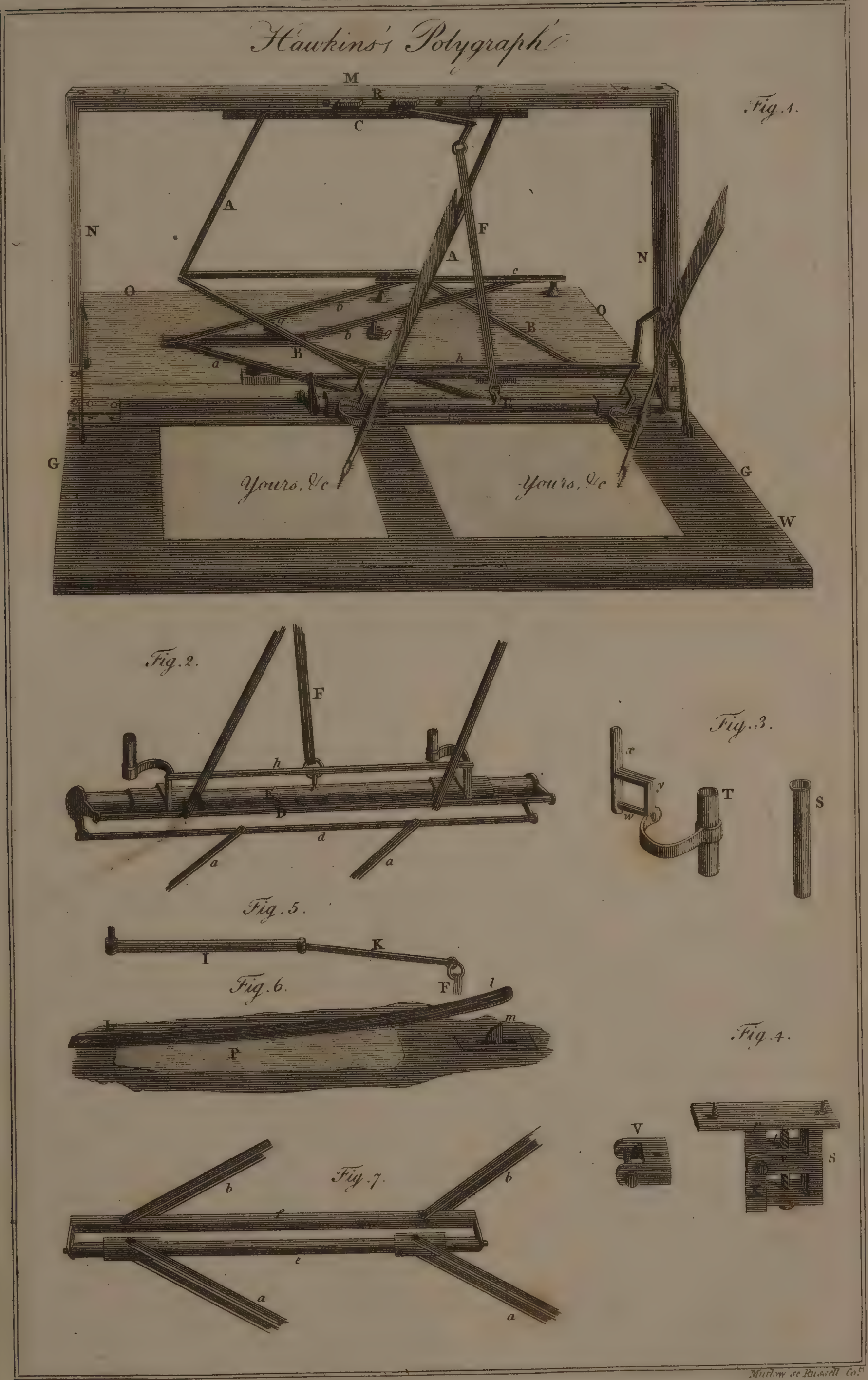
To CO'PY. *v. n.* To do any thing in imitation of something else (*Dryden*).

COPYING MACHINES, or POLYGRAPHS, for the transcription of letters and other writings, have been proposed by several persons, as Franklin, Rochon, Watt, &c. We shall here describe a polygraph, for which a very ingenious mechanist, Mr. J. I. Hawkins, took out a patent in 1803. This instrument makes two or more copies at the same time. The upper part of plate 49 gives a general view of the instrument, while the lower portion exhibits the several parts.

The principle of the machine, is that of several parallel rulers combined: AA, BB, fig. 1, are two parallelograms connected together and suspended on pivots at the end of the bar C, on which it can turn as an axis, so as to swing backwards and forwards. The lower bar D, fig. 2, Pl. 49, of this double parallelogram parallel to C, has a pivot at each end, which enter into holes made in two pieces of brass at the ends of the bar E: *d* is a bar pivoted into two other arms of the same brasses, which constitute part of a similar double parallelogram *a a b b*, fig. 1, whose extreme bar *a*, is screwed by two pillars to the bottom board of the machine. The two parallel rulers which compose this motion, are connected as shewn in fig. 7, the bar *e* of the parallelogram *a a*, is connected with *f* by pivots at its ends, so that *a a* can rise up independently of the other, which is always horizontal; and its weight is supported by two small wheels *gg*, fig. 1, running on the bottom board: by this arrangement, it is evident that the bar E will always continue parallel to itself, and may be moved in any direction within the limits of the board G G. Each pen is connected with the bar E by means of a brass frame, fig. 3, of which T is a tube for the pen, and *x y* two arms which embrace a square part of E, and are connected by a screw W going through the bar, in a hole which it fits so as to turn round easily without shake, as shewn in figs. 1 and 2. The arm *x* is longer than the other, and is jointed at its upper end, to the ends of a small rod *h*, fig. 1 and 2: by these means, the two frames, tubes, and pens, are always kept parallel to each other, and the points at the same distance, being at liberty at the same time, to be inclined in any degree as in fig. 1. The weight of the bar E and parallelograms, is suspended by three small spiral springs F, hooked to a ring at the middle of the bar E; their other ends fastened to a jointed lever, fig. 5, composed of two bars I K jointed together, and turning round on a screw, screwed into the frame, as a centre; so that the end of K, where the springs are hooked, can follow the motion of E, and keep the springs nearly upright. The combined effort of these springs is somewhat greater than the weight they have to bear, so that the pens are always lifted off the paper when not in use, and by that means avoid blotting. The papers to be wrote on are held to the board G G by a piece of brass spring L, fig. 6, screwed to the board by its middle: each end has an oblong hole *l*, through it, which, when it is pressed down, contains a spring catch *m*, for the purpose of holding it down, and fixing the paper P put under it.

The pens are supplied with ink from two inkstands at the proper distance from each other, into which both pens dip at the same time. When the machine is not in use, the upright frame, M N N, fig. 1, folds down on the board *o o*, and is fastened thereto by a spring lock, of which the circle *r* represents the thumb-stud. In this state the instrument forms a shallow box, the horizontal and vertical parallelograms lying upon one another, and the two pens upon the bottom board *o o* beneath them both: the front board G G to which the paper is fastened, now becomes the lid, and the lock R secures the whole.

The instrument from which our drawing was made, when thus closed, measured one foot nine inches long, one foot wide, and four inches deep. In using the machine, no other care or attention is requisite than in writing with a common single pen, and the machinery being very light, opposes no more resistance than must be expected when writing with two pens instead of one. The pens are put through a small brass tube S, fig. 3, which they must fit tightly; and this cylinder goes stiffly into the tube T, before described; the proper depth being regulated by a projecting shoulder at the upper end of S. When the pen requires mending, it is taken out with the tube S upon it and repaired in the common way; but as it will be cut shorter, the shoulder of the tube must be applied to a semicircular hollow in a piece of brass plate W, fig. 1, screwed to the board G G, and the pen pushed through it till its point exactly reaches a mark made on the plate. It may happen, that by the curved pieces which connect the pen tubes T with the bar E being bent a little, the two pens may



Mutlow sc Russell Co.

Published by G. Kearsley, Fleet Street, June 1st 1809.


Coracias.
C. Garrula.
or
Garrulous Roller.
C. Militaris.
or
Crimson Roller.

1 *Caprimulgus Europæus*, or Common Goat Sucker.
2 *Coracias Garrula* or Common Roller
3 *Cuculus Canorus* or Common Cuckoo
4 *Columba Domestica* Rock Pigeon

London Publish'd by G. Kearsley, Fleet Street, Apr. 1st 1808.

not both touch, though gauged as above described; this will be adjusted by the contrivance of one of the pivot holes at the end of the bar C. It is shewn on a large scale in fig. 4: *r s* is a brass cock screwed to the wood work, and has an upright screw *t* turning round between its two arms. This screw passes through a piece of brass V, which will be raised or lowered by turning the screw; this piece carries another screw at right angles to the former, tapped into and giving motion to another upright piece X, in which is the pivot hole for the bar: now if, when the pens are at the top of the paper, the perpendicular screw be turned until both touch, and when at the bottom, the same be done by the horizontal screw, the pens will write, draw, or copy with the greatest accuracy, so that in writing, it cannot afterwards be distinguished which copy was made by the pen actually in the writer's hand. The patent now belongs to Mr. Farthing, Cornhill, by whom the instruments are manufactured. It is evident that three or more pens can be added by only prolonging the bar E, and fitting more pen tubes, fig. 3, to it; connecting them all by the bar *h*. We have seen and tried one of five pens, which acted as well as the others, though of course more fatiguing to the hand.

To COQUE'T. *v. a.* (from the noun.) To treat with an appearance of amorous tenderness (*Swift*).

To Coque't. *v. n.* To act the lover; to entice by blandishments (*Swift*).

COQUE'TRY. *s.* (*coqueterie*, Fr.) Affectation of amorous advances (*Addison*).

CO'QUETTE. *s.* (*coquette*, French.) A gay, airy girl; a girl who endeavours to attract notice, or who after having gained the attention of one lover casts him off flirtingly, and throws herself assiduously in the way of another.

Mr. Gisborne, in his treatise "On the Duties of the Female Sex," cautions his young readers against coquetry in the following descriptive and impressive terms: "To delude a young man by encouraging his attentions for the pleasure of exhibiting him as a conquest, for the purpose of exciting the assiduities of another person, or from any motive except the impulse of mutual regard, is a proceeding too plainly repugnant to justice and to delicacy of sentiment, to require much observation. On such subjects, even inadvertence is highly culpable: what then is the guilt of her, who deliberately raises hopes which she is resolved not to fulfil!"

The iniquity of a similar conduct in men is finely pourtrayed in the song of Fitz Eustace in Mr. Scott's "Marmion."

COR, in anatomy. See Heart.

Cor Caroli, Charles's heart, in astronomy, a name first given by Dr. Halley to a bright star between Asterion and Chara. But the name is now applied to a small constellation in the same situation, containing 0. 1. 0.0. 0. 2, in all, 3 stars of the first six magnitudes.

Cor, is also applied to stars which are situated nearly in the centre of constellations representing animals; as Cor Hydræ, Cor Leonis, Cor Scorpii, &c.

CORA'CIAS. Roller. In zoology, a genus of the class aves, order picæ. Bill sharp-edged, bent in at the point, the base naked of feathers; tongue cartilaginous, bifid; legs short; feet formed for walking. Twenty-five species, scattered over the globe. The most worthy of remark is

C. garrula. Common Roller. Blue, back red; quill feathers black; behind the ears a naked spot; primary quill-feathers beneath blue; middle tail-feathers dirty green, the rest blue, dotted with black on the outer edge; legs dirty yellow. Inhabits Africa, Syria and Europe; size of the jay; is sonorous, gregarious, migratory and timid; builds in trees, particularly the beech; feeds on insects, worms, frogs, nuts and corn: eggs pale-green, with innumerable dusky spots. The rest differ not very essentially. See Plate LIV.

CO'RACLE. *s.* (*cwrwgle*, Welsh.) A boat used in Wales by fishers, made by drawing leather or oiled cloth upon a frame of wicker work.

CO'RACO-BRACHIA'LIS. (Κορακο-βραχιαιος; from κοραξ, a crow, and βραχιον, the arm.) Coraco-brachiæus. A muscle, so called from its origin and insertion. It is situated on the humerus, before the scapula. It arises, tendinous and fleshy, from the fore-part of the coracoid process of the scapula, adhering, in its descent, to the short head of the biceps; inserted, tendinous and fleshy, about the middle of the internal part of the os humeri, near the origin of the third head of the triceps, called brachialis externus, where it sends down a thin tendinous expansion to the internal condyle of the os humeri. Its use is to raise the arm upwards and forwards.

Co'raco-hyoide'us. (*coraco-hyoideus* musculus, κορακο-υοιδαιος; from κοραξ, a crow, and υοειδης, the bone called hyoides.) See Omo-hyoideus.

CO'RACOID. (*coracoideus*, κορακοειδης; from κωραξ, a crow, and ειδος, resemblance; because it is shaped like the beak of a crow.) A name given to a process on the upper and anterior part of the scapula.

CORAL. In helminthology. See Isis.

Coral fishery. Red coral is found in the Mediterranean, on the shores of Provence, from Cape de la Couronne to that of St. Tropez; about the isles of Majorca and Minorca; on the south of Sicily; on the coast of Africa; and, lastly, in the Ethiopic ocean, and about Cape Negro. The divers say, that the little branches are found only in the caverns whose situation is parallel to the earth's surface, and open to the south. The manner of fishing being nearly the same wherever coral is found, it will suffice to instance the method used at the bastion of France, under the direction of the company established at Marseilles for that fishery. Seven or eight men go in a boat commanded by the patron or proprietor; and when

the net is thrown by the caster, the rest work the vessel, and help to draw the net in. The net is composed of two rafters of wood tied crosswise, with leads fixed to them: to these they fasten a quantity of hemp twisted loosely round, and intermingled with some large netting. This instrument is let down where they think there is coral, and pulled up again when the coral is strongly entangled in the hemp and netting. For this purpose, six boats are sometimes required; and if in hauling in, the rope happens to break, the fishermen run the hazard of being lost. Before the fishers go to sea, they agree for the price of the coral, which is sometimes more, sometimes less, a pound; and they engage, on pain of corporal punishment, that neither they nor their crew shall embezzle any, but deliver the whole to the proprietors. When the fishery is ended, which amounts one year with another to twenty-five quintals for each boat, it is divided into thirteen parts; of which the proprietor hath four, the casters two, and the other six men one each: the thirteenth belongs to the company for payment of the boat furnished them.

CORAL-TREE. In botany. See ERYTHRINA.

CORALLINA, Coralline. In zoology, a genus of the class vermes, order zoophyta. Animal growing in the form of a plant; stem fixed, with calcareous, subdivided branches, mostly jointed. Thirty-eight species; some of them on the coast of most countries. These were formerly supposed to be vegetables; but they give the most evident tokens of large portions of ammonia, the common test of animal substance, and have been often traced to spontaneous motion. Every tube, vesicle, or articulation, is probably the inclosure of a distinct animal, so that the entire mass or tree is a family; in this respect resembling the vegetable tree, in which every bud may also be regarded as an individual living plant, and consequently the entire tree be in like manner contemplated as a tribe or republic. We shall select a few specimens.

1. C. officinalis. Common coralline. Doubly pinnate, and sometimes trichotomous; with the joints of the stem somewhat wedge-shaped, or turbinate; those of the branches round, some of the terminal ones capitate. Common on almost every shore; growing in clustered tufts from two to five inches long, about the thickness of a large thread; white, greenish, yellowish, purple, or reddish, and frequently a mixture of all the colours. This species is sometimes used in powder as an absorbent and vermifuge, as is also the corallium, coral, or isis, which has not unfrequently been confounded with this genus. Its utmost medicinal merit is that of being a common absorbent and antacid.

2. C. granifera. Trichotomous; with the joints of the stem compressed, wedge-shaped; those of the branches roundish, and furnished with opposite ovate ovaries, seated on small pedicles. Inhabits the Mediterranean and African seas; sea-green, and of a fine slender texture.

3. C. lapidescens. Dicotomous; with cylindrical, downy branches. Habitation unknown: appears covered with short, hair-like, verticillate down, of a reddish colour, as if the outer calcareous coat were eaten off; or as if another calcareous layer were about to be produced. Stem in some varieties trichotomous.

4. C. flabellum. Stem simple, incrusted, with the branches sticking together, in a foliaceous, fan-shaped manner, and somewhat waved. Inhabits the West Indies; of various colours, from a greenish-brown to milk-white; sometimes of a flat kidney-shaped form, and about an inch high; sometimes expanding to a large, subdivided, lobed, and undulated mass, from one to five inches high, and as many broad: stem terminated by a tuft of five radical tubes.

5. C. terrestris. With opposite branches, cylindrical joints, and lateral, peduncled, transversely wrinkled fructifications. Inhabits the woods of Friesland: a few lines high; and probably, when more minutely examined than it hitherto appears to have been, will be discovered to be a shrubby lichen.

CO'RALLINE. *a.* (*corallinus*, Lat.) Consisting of coral; approaching to coral (*Woodward*).

CORALLO-DENDRON. In botany. See ERYTHRINA.

CO'RALLOID, or CORALLOIDAL. *a.* (κοραλλοειδής.) Resembling coral (*Brown*).

CORANT. (*courant*, Fr.) A solemn kind of dance. It is composed in the time marked $\frac{3}{4}$; and the number of bars is always a multiple of 8.

CO'RBAN. *s.* (קרבן) An almsbasket; a gift; an alms (*King Charles*).

For the scriptural meaning of the word used as an oath, we refer to Doddridge's Expositor, vol. i. p. 462. note *g*.

CORBAN also denotes a ceremony in use among the Mahometans, yearly performed at the foot of mount Ararat in Arabia, near Mecca. It consists in slaying a great number of sheep, and distributing them among the poor.

CORBE. *a.* (*courbe*, Fr.) Crooked (*Spenser*).

CO'RBEILS. *s.* Little baskets used in fortifications, filled with earth.

CORBEL, in architecture, the representation of a basket, sometimes seen on the heads of caryatides.

CORBEL, or CORBIL, is also used for a short piece of timber projecting six or eight inches out of a wall, as a kind of shouldering piece for something to rest on.

CORCANG, or JURGANTZ, a town of Asia, seated on a river anciently called Oxus, which ran from the Caspian sea to the lake Aral; but the Tartars have, by some means, dried up its channel. It is 90 miles S. of the lake Aral. Lat. 40. 57 N. Lon. 65. 5 E.

CO'RCHORUS. Jews-mallow. In botany, a genus of the class polyandria, order monogynia. Calyx five-leaved, deciduous;

petals five; capsule many-valved, with cells. Fourteen species; natives of the East and West Indies, and South America. The plant rises commonly, with a round, striated, upright stem, to the height of two feet; the flowers are yellow, and stand on short axillary peduncles.

CORCULUM. In botany, (dimin. from *cor*, the heart.) The corcle, heart, or essence of the seed. The rudiment of the future plant. Attached to and involved in the cotyledons. Consisting of the plume, plumule, or scaly ascending part; and the rostel, or radicle, the simple descending part.

CORCYRA. See CORFU.

CORD, or CHORD, an assemblage of several threads of hemp, cabled or twisted together by means of a wheel. (See CORDAGE). The word comes from the Greek χορδη, which properly signifies an intestine or gut, of which cords may be made. See CHORD.

CORD (Magical), an instrument in great use among the Laplanders, and by them supposed to be endowed with extraordinary virtues. It is a cord or rope with three knots tied on it. They use many magical rites and ceremonies in the tying of this cord; and, when thus prepared, it is supposed to have power over the winds; and they will sell, by means of it, a good wind, or at least the promise of one, to a ship. If they untie only one of these knots, a moderate gale succeeds; if two, it is much stronger; and if three, a storm is sure to follow.

CORD OF WOOD, a certain quantity of wood for burning, so called because formerly measured with a cord. The dimensions of a statute cord of wood are eight feet long, four feet high, and four feet broad.

CORD-WOOD, is new wood, and such as, when brought by water, comes on board a vessel, in opposition to that which is floated.

CORD-MAKER. *s.* (*cord* and *make*.) One whose trade is to make ropes; a ropemaker.

To CORD. *v. a.* (from the noun.) To bind with ropes; to close by a bandage.

CORDAGE, a term used in general for all sorts of cord, whether small, middling, or great. (See ROPE.) The naval cordage of the earlier ages was in all probability only thongs of leather. These primitive ropes were retained by the Caledonians in the third century. The nations to the north of the Baltic had them in the ninth or tenth centuries: and the inhabitants of the western isles of Scotland make use of them at present; cutting the skin of a seal, or the raw and salted hide of a cow into long pieces, and fastening the plough to their horses with them, or even twisting them into strong ropes of twenty or thirty fathoms length. But these, in the south of our island, and on the continent, were early superseded by the use of iron chains. The very maritime and commercial nation of the Veneti, that were so intimately connected with the Belgæ of Britain, used iron chains for their cables in the days of Cæsar. But in the more distant and refined countries of the south, both thongs and these had given place to the use of vegetable threads, and the arts of combining them into strength. In this manner the Greeks appear to have used the common rushes of their country, and the Carthaginians the spartum or broom of Spain. And as all the cordage of the Romans was made of these materials at their last descent on our island, so the art of manufacturing them would be necessarily introduced with the Roman settlements among the Britons. Under the direction of Roman artists their thongs of leather would naturally be laid aside, and the junci, or rushes of the plains, worked up into cordage. And what remarkably coincides with this opinion is, that the remains of old cables and ropes are still distinguished among the British sailors by the name of old junk.

Huddart's patent for the manufacture of cordage is given in the Repertory of Arts, &c. vol. iv. p. 87. The patents of Chapman and Curr are described in subsequent volumes of that work.

CORDAX, in antiquity, a gay sort of dance.

CORDATED, an appellation frequently given by naturalists to things somewhat resembling a heart.

CORDED, in heraldry. A cross corded, some authors take for a cross wound or wrenched about with cords: others, with more probability, take it for a cross made of two pieces of cord.

CORDELERAS, mountains of South America, otherwise called Andes.

CORDELIER, a Franciscan, or religious of the order of St. Francis. The Cordeliers are clothed in thick grey cloth, with a little cowl, a chaperon, and cloak, of the same; having a girdle of rope or cord tied with three knots: whence the name. They are otherwise called Minor Friars, their original name.

CO'RDIA. In botany. A genus of the class pentandria, order monogynia. Corol funnel-form; style forked; drupe with a two-celled nut. Eighteen species; scattered over Asia, Africa, and America. The following are the only three worth particularising.

1. C. myxa; with ovate leaves, glabrous above: corymbs lateral; calyxes ten, striate. Height about that of a middling plum-tree; flowers white, and in bunches; each consisting of a single tubular petal, with a calyx of the same kind, nearly of an equal length, and cut into five segments to the brim. The fruit is eaten in Turkey; and the wood is often used to promote fire by friction.

2. C. sebestena, with leaves oblong, ovate, repand, rough: sending forth shrubby stalks eight or ten feet high. The flowers are terminal in large clusters, of the shape and colour of the marvel of Peru, and are highly beautiful; the stamens sometimes amount to six. The fruit is also eaten as that of c. myxa; and the aroma of the wood in burning, perfumes a room with an agreeable odour.

3. C. collococca: a native of Jamaica, with leaves oblong-ovate, very entire; flowers corymbed; calyxes downy internally. In Ja-

maica this is called the clammy-cherry, or turky-bearing-tree.

CO'RDIAL. *s.* (from *cor*, the heart, Latin.) 1. A medicine that increases the force of the heart, or quickens the circulation. 2. Any medicine that increases strength (*Arbuthnot*). 3. Any thing that comforts, gladdens, and exhilarates (*Dryden*).

Co'rdial. *a.* 1. Reviving; invigorating; restorative (*Shakspeare*). 2. Sincere; hearty; proceeding from the heart (*Hammond*).

CORDIA'LITY. *s.* (from *cordial.*) 1. Relation to the heart (*Brown*). 2. Sincerity; freedom from hypocrisy.

CO'RDIALLY. *ad.* (from *cordial.*) Sincerely; heartily; without hypocrisy (*South*).

CORDIERS. (Fr.) Ropemakers.

CORDILLERAS. See Andes.

CORDINE'MA. (κορδινημα, from καρα, the head, and δινεω, to move about.) Vertigo; head-ach attended with a swimming or turning round of circumjacent objects.

CO'RDINER. *s.* A shoemaker.

CORDON, in fortification, a row of stones, made round on the outside, and set between the wall of the fortress, which lies aslope, and the parapet which stands perpendicular, after such a manner, that this difference may not be offensive to the eye: whence the cordons serve only as an ornament, ranging round about the place, being only used in fortification of stone-work. For in those made with earth, the void space is filled up with pointed stakes.

CORDOVA, or Cordoua, anciently Corduba, an episcopal town of Andalusia, in Spain. The roof of its cathedral is supported by 365 pillars of different sorts of marble. It is 135 miles S. by W. of Madrid. Lat. 37. 52 N. Lon. 4. 4 W.

CORDOUA (New), a town of Tucuman, in S. America. Lat. 32. 10 S. Lon. 62. 5 W.

CO'RDWAIN. *s.* (Cordovan leather, from Cordova in Spain.) Spanish leather (*Spenser*).

CORDWAINERS, or Cordiners, the term whereby the statutes denominate shoemakers. The word is formed from the French *cordonnier*, which Menage derives from *cordouan*, a kind of leather brought from Cordoua, whereof they formerly made the upper leathers of their shoes. Others derive it from *corde*, rope, because anciently shoes were made of cords; as they still are in some parts of Spain, under the name of alpargates. But the former etymology is better warranted: for, in effect, the French workmen who prepare the corduas are still called cordouanniers.

CORDYLOCARPUS. In botany. A genus of the class tetradynamia, order siliquosa. Silique cylindrical, swelling into knobs, jointed; the uppermost joint distinct; calyx closed. Two species only, natives of the Mediterranean coast.

CORE. *s.* (*cœur*, French.) 1. The heart (*Shakspeare*). 2. The inner part of any thing (*Raleigh*). 3. The inner part of a fruit which contains the kernels (*Bacon*). 4. The matter contained in a sore (*Dryden*).

COREA, a peninsula lying to the N.E. of China, between 99 and 109 degrees of E. lon. and between 32 and 46 degrees of N. lat. The principal town is Hanching, where the king resides. It is tributary to China.

COREIA, in antiquity, a festival in honour of Proserpine, named Core, Κορη, which in the Molossian dialect signifies a beautiful woman.

CORELLI (Arcangelo), a famous musician of Italy, was born at Fusignano, a town of Bologna, in 1563. His first instructor in music was Simonelli, a singer in the pope's chapel; but his genius leading him to prefer secular to ecclesiastical music, he afterwards became a disciple of Bassani, who excelled in that species of composition, which Corelli always delighted in, and made it the business of his life to cultivate. It is presumed that he was taught the organ: nevertheless, he had an early propensity to the violin, on which he made so great a proficiency, that some have not scrupled to pronounce him then the first performer on it in the world. About 1672 his curiosity led him to visit Paris; but the jealous temper of Lully not brooking so formidable a rival, he soon returned to Rome. In 1680 he visited Germany, was received by the princes there suitably to his merit; and, after about five years stay abroad, returned and settled at Rome.

While thus intent upon musical pursuits at Rome, he fell under the patronage of cardinal Ottoboni; and is said to have regulated the musical academy held at the cardinal's palace every Monday afternoon. Here it was that Handel became acquainted with him; and in this academy a serenata of Handel, entitled, Il Trionfo del Tempo, was performed: the overture to which was in a style so new and singular, that Corelli was confounded in his first attempt to play it. This serenata, translated into English, and called The Triumph of Time and Truth, was performed at London in 1751. The merits of Corelli, as a performer, were sufficient to attract the patronage of the great, and to silence, as they did, all competition; but the remembrance of these is at this day absorbed in the contemplation of his excellencies as a musician at large; as the author of new and original harmonies, and the father of a style not less noble and grand than elegant and pathetic. He died at Rome in 1713, aged almost 60; and was buried in the church of the Rotunda, otherwise called the Pantheon; where, for many years after his decease, he was commemorated by a solemn musical performance on the anniversary of his death.

In the opinion of Geminiani, Corelli's "merit was not depth of learning, like that of Allesandro Scarlatti; nor great fancy, or rich invention in melody or harmony; but a nice ear and most delicate taste, which led him to select the most pleasing harmonies and melodies, and to contract the parts so as to produce the most delightful effects upon the ear."

COREOPSIS. In botany. A genus of

the class syngenesia, order polygamia frustranea. Receptacle chaffy: seeds compressed, emarginate, with a two horned crown; calyx double; each of them many-leaved. Twenty-five species; natives of the East or West Indies, or South America. They are chiefly herbaceous perennials, rising from three to six feet, with clusters of yellow terminal-flowers, like sunflowers, but not so large. They are easily propagated by root slips.

CORETT. In ichthyology. See SCOMBER THYNNUS.

CORFE-CASTLE, a borough in Dorsetshire, with a market on Thursday. It is seated in a peninsula called the Isle of Purbeck. It sends two members to parliament. Lat. 50. 36 N. Lon. 2. 4 W.

CORFU, anciently CORCYRA, a considerable island near the entrance of the Gulph of Venice, in the Mediterranean sea, belonging to the Venetians. The country abounds in vineyards, lemons, olives, and cypress-trees. Its principal town is of the same name. Lat. 39. 40 N. Lon. 20. 0 E.

CORIA, an episcopal town of Leon, in Spain, 120 miles S.W. of Madrid. Lat. 40. 0 N. Lon. 5. 30 W.

CORIA'CEOUS. *a.* (*coriaceus*, Latin.) 1. Consisting of leather. 2. Of a substance resembling leather (*Arbuthnot*).

CORIACEOUS. In natural history. Stiff like leather or parchment. Applied to the leaf, calyx, and capsule of plants; and the wings of insects.

CORIANDER. See CORIANDRUM.

CORIANDRUM. (*coriandrum*, κοριανδρον, from κορη, a pupil, and ανηρ, a man; because of its roundness like the pupil of a man's eye.) Coriander. In botany, a genus of the class pentandria, order digynia. Fruit spherical; corol radiate; petals inflected, emarginate; general involucre, one-leafed; partial, halved. Two species.

1. C. testiculatum. Fruit double: found in the south of Europe.

2. C. sativum. Fruit globular; seeds hemispheric. Found on the road-sides and other wastes of our own country. Every part of the plant has a very offensive odour; but upon being dried the seeds have a tolerably grateful smell, and their taste is moderately warm, and slightly pungent. They possess a stomachic and carminative power, and are directed in the *infusum amarum*, *infusum sennæ tartarisarum*, and some other compositions of the pharmacopœias.

CORIA'RIA. Samach. In botany, a genus of the class dioecia, order dodecandria. Calyx five-leaved, petals five; united to, and resembling the calyx. Male: anthers two-parted. Female: styles five; seeds five, covered with the succulent berried petals. Three species: south of Europe; Chili; New Zealand.

CORICEUM, in antiquity, the undressing room of the Gymnasium.

CORIDOR, in architecture, a gallery or long aisle around a building, leading to several chambers at a distance from each other.

CORIDOR. In fortification. See COVERT-WAY.

CORINE. In zoology. See ANTILOPE.

CORINTH (The Isthmus of), is that neck of land which joins the Morea to Greece, and reaches from the Gulph of Lepanto to that of Egina. Julius Cæsar, Caligula, and Nero, made several unsuccessful attempts to cut a channel through it.

CORINTH, CORANTHO, or GERAME, a very ancient town of the Morea, supposed to have been founded 1514 years before Christ, by Sisyphus, the son of Eolus, and grandfather to Ulysses. This city preserved its liberty till the year before Christ 146, when it was pillaged and burnt by the Romans. Julius Cæsar rebuilt the town, and sent a Roman colony to it. When the Roman empire was divided, it fell to the district of Constantinople; and on the decline of that empire, it fell into the hands of the Venetians, from whom it was taken by Mahomet II. The Venetians regained it in 1678; but the Turks got possession of it in 1715, and have kept it ever since. It is 40 miles N.W. of Athens. Lat. 38. 14 N. Lon. 23. 3 E.

CORINTHIAN ORDER, the finest of all architectural compositions, in which we see proportion, simplicity, elegance, and richness, combined in a degree almost exceeding imagination, and which we are persuaded will never be surpassed, whilst architecture has an existence. This order is, and will continue to be, a perpetual memorial of the exquisite taste and genius of the ancient Grecians. Scamozzi calls it the virginal order; an epithet truly characteristic of the delicacy and tenderness of composition apparent in the whole. Conformably to the whole of its character, the ancients employed it in works of magnificence, grandeur, and delicacy.

The base of the column may be either Attic or Corinthian, since both are beautiful. The entablature is generally much enriched, particularly by the ancients, who introduced in the frieze representations of various figures (see Plate 4). A very full display of these may be found in Stewart's Antiquities of Athens. When the entablature is thus enriched, the columns are fluted, and the flutings may be filled with cablings, one third, from the bottom, of the whole height of the shaft, as in the inside of the Pantheon. In most of the antiques at Rome, the capital of this order is decorated with olive-leaves; the acanthus being seldom employed but in the composite.

The general proportions of this order are as follow: The whole height of the entire order is divided into five equal parts, and one is given for the height of the pedestal. The remaining four are divided into six equal parts; one is assigned for the entablature, and the remaining five are assigned to the height of the column, including its base and capital; which are again divided into equal parts, one of which is for the

inferior diameter. The base is 30 minutes; and the capital 70, in height. The cornice is 48 minutes, both in height and projection.

The soffit of the corona is worked in square compartments, as in the composite; but the soffit of the modillion is ornamented with an olive-leaf, the same as in the capital. The breadth of the modillion is 10 minutes and a half; and the space between each modillion twice their width. See ARCHITECTURE.

CORINTHIANS (Epistles to the), in biblical history, are two letters addressed by the apostle Paul to the inhabitants of Corinth, including both Gentile and Jewish converts, and comprehended in the sacred canon of the New Testament.

The first of these epistles was written, according to the best critics, at Ephesus, either in the spring of the year 56 or 57. St. Paul had, three or four years before, planted a numerous Christian church, chiefly of Gentile converts, at Corinth; the wealth and luxury of which city soon tempted them into vices and debaucheries of various sorts. The epistle was written to answer some important queries proposed by the Corinthians; and to correct some abuses and disorders which had crept in among them during his absence.

As to the abuses: The first article related to the parties and factions, into which they were fallen, and the opposition made by some of them to Paul's apostolical mission (ch. i. 10. to the end of ch. iv.) The second related to the case of a notorious offender in the Corinthian church, who had taken to him in marriage his own father's wife (ch. v.) The third article which he exhibits against them, is that by a covetous and litigious temper they were led to prosecute their brethren in the heathen courts (ch. vi. 1—11.) In the fourth the apostle cautions them against fornication, to which they had been in their Gentile state greatly addicted: and it should seem that there were even now some among them, who reckoned it among the things indifferent (ver. 12, to the end).

The apostle afterwards proceeds to answer certain questions, which it seems the Corinthians had proposed. And here he determines first, those which related to the marriage state (ch. vii.) Secondly, how far they might comply with their heathen neighbours in eating things sacrificed to idols (ch. viii.—xi. 1.) Thirdly, in what manner women should deliver any thing in public, when by a divine impulse called to it (ch. xi. 2.); and, being on the subject of public worship, he takes notice of the abuses which attended their manner of celebrating the Lord's Supper (ver. 17, to the end); their spiritual gifts (ch. xii. 1—13.); inculcating humility in the use of them (ver. 15, to the end); recommending Christian love (ch. xiii.); and cautioning them against an ostentatious display of their gifts, especially that of tongues (ch. xiv. 1—20.) And lastly, as some of the Corinthians doubted, and others denied the resurrection of the dead, the apostle proves and establishes this great and peculiar article of the Christian faith.

The Second Epistle to the Corinthians was written somewhat more than a year after the former, about the end of A. D. 57, or beginning of 58. Upon leaving Ephesus, whence he had written his former epistle, Paul removed to Troas, in expectation of meeting Titus, in order to hear what success that epistle had experienced; but not meeting him there, he proceeded to Macedonia, where he received from him the desired intelligence; in consequence of which he wrote back by him this second epistle. The intention of it is, in general, to illustrate some of the points upon which he had discoursed in his first epistle, according to the light which Titus had given him into the circumstances and temper of the Corinthian church. Thus, he again considers the case of the incestuous person, and gives fresh directions how to proceed with regard to him (ch. ii. 1—15.) He offers a farther vindication of his apostolical character against the insinuations and objections of the false teachers at Corinth (ch. ii. 14, &c.) He also enforces and intersperses such other occasional reflections and advices, as he thought most conducive to their instruction.

The late Dr. Paley has made some excellent observations in his "Horæ Paulinæ," on the undesigned agreement or conformity that may be traced between these letters of Paul to the Corinthians, and the history of his life and travels in the book of the Acts of the Apostles. See also Doddridge's Expositor, vol. iv. and Whitby's Comment, vol. ii.

CORIOLANUS (Caius Martius), an illustrious Roman, who obtained that name from his valour at Corioli, where from a private soldier he was raised to military honour. When Gelo king of Sicily sent a quantity of grain to Rome as a present, Coriolanus imprudently advised that it should be sold, and not distributed gratis. For this he was tried and banished. He then went to Tullus king of the Volsci, whom he advised to make war upon the Romans. He became the general of the Volscian army, and upon his march was met by several ambassadors from Rome, who offered him liberal terms if he would return to his country; but he was inexorable, till his mother and wife, attended by the matrons of Rome, came to him in deep mourning. Their tears and entreaties prevailed, and he marched from the neighbourhood of Rome; for which Tullus had him murdered, B. C. 488.

CORIS, or COURIES. In commerce. See BIÆ.

CO'RIS. In botany. A genus of the class pentandria, order monogynia. Corol one-petalled, irregular; calyx spinous; capsule five-valved, superior. One species only; a native of Montpellier, and other places in the south of Europe; with red stem; linear, alternate leaves; and red or white flowers. It grows about six inches high, and spreads about like

heath. It may be easily propagated by seeds; and when in flower has an elegant appearance.

CORISPE'RMUM. In botany. A genus of the class monandria, order digynia. Calyxless; petals two; seed one, oval, naked. Two species; natives of the south of Europe; but not possessed of any particular beauty.

CORITANI, inhabitants of ancient Albion, being, according to Camden, the inhabitants of that part of England which is now divided into the counties of Northampton, Leicester, Rutland, Lincoln, Nottingham, and Derby.

CORK, a county of Ireland, having Kerry and the sea on the W. Limerick on the N. and the Atlantic ocean on the S. and S.E. It is fertile, rich, and populous; it contains 232 parishes, and sends 26 members to parliament.

Cork, the capital of the above county, is the see of a bishop, and ranks next to Dublin for magnitude, wealth, and commerce. It stands 17 miles up the river Lee, is 120 miles S.W. of Dublin, and contains near 9000 houses. It has a deep, well-sheltered haven, but only small vessels can come up to the city; from which more beef, tallow, and butter, are shipped off, than from all the other parts of Ireland together. Lat. 51. 54 N. Lon. 8. 23 W.

Cork, a stopple for a bottle or barrel, cut from the wood of the quercus.

Cork. The substance from which the above is obtained. The bark of an ever-green oak: the quercus suber of Linnéus (see Quercus), that grows in the southern parts of Europe, and on the shores of the Mediterranean. It is stripped off every three years in large masses, from two to three inches in thickness, and of a somewhat curved figure, corresponding with that of the trunk of the tree. The only preparation which cork undergoes, is that of being flattened; for this purpose it is scorched on both sides to soften it, and in this state is laid between flat, heavy planks, till it is cold. Cork is of a light brown colour, and a very fine spongy texture; is very soft, but requires an extremely sharp knife to cut it smoothly, a dull one only tearing it. It is considerably elastic, and its specific gravity is no more than 0.24; hence it is the most buoyant in water of any ligneous substance. It has a faint peculiar aromatic odour, and little or no taste. It is readily inflammable, burning with a large yellow flame, which however soon goes out of itself, and leaves behind a bulky, soft, impalpably pulverulent charcoal. Water, by long decoction with cork, acquires a brownish colour, and takes up a quantity of extractive matter, in the proportion of about 40 grains from an ounce; of the residue, alcohol takes up 11 grains. An ounce of cork, digested first in alcohol, lost 42 grains; and by subsequent decoction in water, 8 grains more. From the spirituous tinctures, a powdery matter precipitated, of a reddish colour when the cork had not been previously boiled with water, but otherwise of an ash-grey. Cork is corroded, and almost entirely dissolved by nitrous acid; and in 1787, Brugnatelli repeating this experiment, thought that a peculiar acid was thus produced. The investigation was afterwards taken up by B. La Grange, with the following result. He took finely rasped cork, and added to it, in a retort, sixtimes its weight of moderately strong nitrous acid. By digestion at a moderate temperature, nitrous gass is given out, the cork swells and becomes yellow, and finally, is almost entirely dissolved. When the red vapours cease, the liquor is to be transferred into a glass capsule, and is to be gently evaporated till it becomes thick, and a pungent vapour begins to be disengaged. A substance is thus procured of the consistence of thick honey, of a lemon yellow colour, and lively, penetrating, aromatic odour. In order to separate the acid generated in this process from the other matters with which it is mixed, the whole is to be dissolved in twice its weight of hot distilled water, and passed quickly through a filter, by which a small quantity of an inflammable substance, analogous to wax, will be separated. The clear liquor is of a light amber colour, with an odour approaching to that of prussic acid. By refrigeration it becomes turbid, and deposits a pulverulent sediment, which is the acid of cork, or suberic acid. The acid yet remaining in the mother liquor, may likewise be obtained by repeated evaporation and cooling: the suberic acid thus prepared, is of a yellowish brown colour, but may be whitened by being boiled with fresh burnt charcoal. When pure, it is in a solid form, but not crystallizable; it is acidulous, and bitter to the taste; is volatilizable by a moderate heat; decomposes all the metallic, and many of the earthy salts; and combines with the alkalies into crystallizable salts. Hence it is considered by La Grange as a peculiar acid, and Fourcroy has ranked cork, under the name suber, as one of the vegetable principles. The two chemists, however, above-mentioned, appear to have been led into an error from not having examined the composition of cork previous to treating it with nitric acid; on which account the following facts may not be unacceptable to the reader. If cork, previously reduced by filing to extremely fine powder, is digested with alcohol, a brownish yellow tincture is produced, possessing the faintly aromatic odour of cork, and causing a slight ochery precipitate in red sulphat of iron: this alcoholic solution being evaporated to dryness by a very gentle heat, leaves behind it a brittle, brownish sediment, of a somewhat astringent taste, and considerably inflammable.

By digestion with water, a portion of it is dissolved, consisting principally of gallic acid and tannin; for it forms a black precipitate, with red sulphat of iron, and throws down a curdy insoluble precipitate from a solution of isinglass. The portion insoluble in water appears to be chiefly resinous, and this, no doubt, it is which marks the peculiar characters of the gallic acid in the alcoholic solution. After alcohol has extracted from cork all that it is capable of taking up, the residue, when digested in a weak solution of caustic potash, requires a deep reddish brown colour, which it communicates to the menstruum. Muriatic acid, added to saturation, nearly destroys this colour, without occasioning any sensible turbidness; nor does the neutralized solution produce any change in red sulphat of iron, so that it is probable that the alkali dissolves little or nothing but a small quantity of carbon. Hence it appears likely that the suberic acid of La Grange is only gallic acid, converted by nitrous acid into oxalic acid, and combined with a little resinous extract; and that the suber of Fourcroy consists of vegetable fibre in a very loose state, mixed with resinous and extractive matter, and a little tannin and gallic acid.

This tree, as well as the uses to which its bark

is put, was known to the Greeks and the Romans; by the former of whom it was called φελλος, and by the latter *suber*. By the Romans, as we learn from Pliny, it was even employed to stop vessels of every kind; but its application to this use seems not to have been very common till the invention of glass bottles, of which professor Beckmann finds no mention before the 15th century.

In later times, some other vegetable productions have been found which can be employed instead of cork for the last-mentioned purpose. Among these is the wood of a tree common in South America, particularly in moist places, which is called there monbin or monbain, and by botanists spondias lutea. This wood is brought to England in great abundance for that use. The spongy root of a North American tree, known by the name of nyssa, is also used for the same end, as are the roots of liquorice, which on that account is much cultivated in Sclavonia, and exported to other countries.

Cork is applied to various uses by different nations. The Egyptians made coffins of it, which being lined with a resinous composition, preserved dead bodies from corruption. The Spaniards burn it, to make that kind of light colour we call Spanish black, used by painters. They also employ it to line stone walls; an expedient which not only renders them much warmer, but also corrects their moisture in damp weather.

In medicine, the bark, as well as the acorn of the cork-tree, are reputed to be astringent, after being burnt, reduced to powder, and used externally. But in Britain, the former is principally employed for stopping bottles and casks, and lining the inner soles of shoes and slippers. Cups made of cork are said to be of service to hectical persons, when used as their common drinking-vessels.

In the Gentleman's Magazine for 1758, we meet with the following curious contrivance of a cork-waistcoat, for the purpose of preventing accidents by drowning. It was invented by Mr. Dubourg, and is composed of four pieces of cork, two for the breasts, and two for the back, each being nearly of the same length and breadth, as the quarters of a common waistcoat, without flaps; the whole is covered with coarse canvas, having two holes to put the arms through. There are spaces left between the two back pieces and each back and breast piece, that they may the more easily be adjusted to the body. Thus, the waistcoat is open only in the front, and may be fastened on the wearer with strings; or, if it should be thought more secure, with buckles and leather straps.

The weight of this cork-waistcoat does not exceed twelve ounces, and may be made at a very moderate expence. It is more simple in its form than any other contrivance for a similar purpose. Mr. Dubourg has made trial of its efficacy in the Thames, and found that it not only supported him on the water, but that even two men, with their utmost efforts, were not able to sink him. Hence it is eminently calculated for mariners, passengers at sea in general, and likewise for all those who resort to bathing places for the benefit of their health; as the most timorous and delicate person may, with perfect safety, boldly venture with one of these waistcoats into a rough sea. See BAMBOO-HABIT.

CORK CUTTING, or the manufacturing of corks. This business, though it is thought one of the most dirty, is not one of the least profitable; it is likewise easy in the acquirement. The cork, after being pressed into square pieces, is received by the cork-cutters, and if not sufficiently flat for their purpose, they lay it again over a fire in their burning-yard, turning the convex part to the flame; the heat, by twisting the edges of the bark, counteracts the natural bend, and compels it to receive a flat form. During this operation, a considerable degree of attention is paid to smoothing it, and particularly again to cover its defects. It is next cut into slips, narrow or wide, according to the intended cork, bung, or tap, for such are the names of the general divisions in this business. The use of the two former is well known; the latter is used for stopping the tap-holes of barrels, as the name implies. These slips are again cut into squares, of a length proportioned to the use they are intended for. This operation is performed by one man, from whom they are handed forward to several others. A further division of corks takes place, of these different sorts, according to their lengths, and are denominated short, short long, and full long. The cork-maker places himself before the table or plank, on which is fastened a board about three inches thick, four broad, and twelve long: immediately on a line with his left hand is a piece of wood rising about four inches from the board, and fixed about the middle of it, on which the cork is laid after being cut as above. This wood not only supports the cork, and is as a guide to the workman, but by its elevation above the board gives room for the knife to cut a part of the cork in a smooth and circular manner, without striking on the table below. The piece is then turned to where the last cut ceased, and this is continued until the knife has gone completely round; the top and bottom are then pared level, and the cork thrown into a box or basket with the rest of the same length. As the bark is not of the same quality throughout each piece, the corks are sorted by a boy into four kinds, superfine, fine, common, and coarse, and are sold accordingly. The only tool employed by the cork-cutter is a knife about three inches broad in the blade, and about six inches long, very thin and sharp, and equal in breadth from the handle nearly to the end, which is finished by a gentle curve. This knife he sharpens upon the board where the guard is placed, by one whet or stroke on each side, after every cut, and now and then upon a common whetstone. (*Rees's Cycloped.*).

CO'RKING-PIN. *s.* A pin of the largest size (*Swift*).

CO'RKY. *a.* (from *cork.*) Consisting of cork; resembling cork (*Shakspeare*).

CO'RMORANT. *s.* (*cormoran*, French.) 1. A bird that preys upon fish. 2. A glutton. See PELICANUS.

CORN. *s.* (corn, Saxon.) 1. The seeds which grow in ears, not in pods; such as are made into bread (*Shakspeare*). 2. Grain yet unreaped (*Knolles*). 3. Grain in the ear, yet unthrashed (*Job*). 4. An excrescence on the feet, hard and painful (*Wiseman*).

To CORN. *v. a.* (from the noun.) 1. To salt; to sprinkle with salt. 2. To granulate.

CORN, in rural affairs, the grain or seeds of plants separated from the spica or ear, and used for making bread, &c. Of these there are several species, as wheat, rye, barley, &c. Europe, in every part of it; Egypt, and some

other cantons of Africa, particularly the coasts of Barbary; and many parts of America, produce corn in abundance. Other countries have maize and rice in lieu of it; and some parts of America, both in the islands and continents, simple roots, such as potatoes and minioc. Egypt was anciently the most fertile of all other countries in corn; as appears both from sacred and profane history. It furnished a good part of the people subject to the Roman empire, and was called the dry nurse of Rome and Italy.

With regard to the first discovery and culture of corn, authors are much divided: the common opinion is, that in the first ages men lived on the spontaneous fruits of the earth; as acorns, and the nut or mast produced by the beech; which, they say, took its name *fagus*, from the Greek φαγω, I eat. It is added, that they had not either the use of corn, or the art of preparing or making it eatable. For the methods of cultivating grain, &c. see HUSBANDRY.

In order to ascertain the relative value of different species of grain, corn-dealers avail themselves chiefly of the combined criterion of weight and measure. In a commercial point of view, such a method is doubtless the most accurate; but for the present, we shall communicate to our economical readers only a few practical directions, by an attention to which, they may be sufficiently guided in the sale or purchase of corn in general.

1. Take a handful of grain from a heap, or sack, and compress it closely for a minute; then pass it from one hand into the other, and attentively examine its flavour, whether it possess any peculiar smell, different from that which is natural to the species: in which case you may conclude that it has been repeatedly exposed to moisture, and undergone a slight degree of fermentation. The flour obtained from such corn is deficient in measure, of an indifferent quality, and affords neither nourishing nor wholesome bread.

2. If, on pressure by the hand, the grains appear so solid and smooth that they in a manner glide through the fingers, without having any foreign smell or colour, in this case it may be pronounced perfectly dry, and in a good state of preservation.

3. Should, on the contrary, the corn feel rough, or, if a number of grains, after compressing them by the dry hand, clog together and adhere to the fingers, it may be justly apprehended that such wheat, rye, &c. is damp, and possessed of all the bad properties before specified.

As the nature of the present work does not permit us to enter into a minute analytical account of the specific gravity of different kinds of corn, and their relative proportion to each other (which properly belongs to the mercantile speculator), we shall supply this apparent deficiency, by the following comparative view.

Every attentive observer will find, that frequently some species of grain bears a price in the market far exceeding its relative value, or proportion to other kinds of grain, which, in many instances, may serve as excellent substitutes. From the prices which have prevailed in different countries, during a long series of years, we have derived the following result of numbers:

Wheat	41
Rye	32
Barley	23
Oats	14

Table of Proportions.

	Wheat.		*Rye.*		*Barley.*		*Oats.*	
Wheat	1	1	5	4	7	4	3	1
Rye	4	5	1	1	3	2	16	7
Barley	4	7	2	3	1	1	8	5
Oats	1	3	7	10	5	8	1	1

It deserves, however, to be remarked, that these proportions occasionally vary, accordingly as the soil of different countries is more favourable to the production of one species of grain than to the other; and likewise as there is a greater or less demand for particular kinds of corn in the market, especially in barren or unproductive seasons. Thus, in Britain, the price of barley and oats is almost constantly disproportionate to that of wheat, and especially to rye, which may, consequently, be considered as the cheapest bread-corn. The immense quantities of malt-liquors brewed in this country, and the great number of horses kept for pleasure, are sufficient reasons why barley and oats are sold at prices comparatively higher than their intrinsic value, in relation to wheat and rye. But if the rates stated in the preceding table be adopted in the computation of prices, and the farmer, or corn-dealer, be desirous to know what proportion, for instance, the price of oats bears to that of rye, let him search in the horizontal line for oats, and in front of the perpendicular line for rye: the field, or partition where both meet, contains the numbers 7 : 16, namely, that the price of oats is in proportion to that of rye, as seven to sixteen; and so on, with respect to the other species of corn here exhibited.

CORN (Indian). In botany. See ZEA.

CORN (Cockle). See AGROSTEMMA.

CORN (Flag). See GLADIOLUS.

CORN (Marigold). See CHRYSANTHEMUM.

CORN (Parsley). See SISON.

CORN (Rocket). See BUNIAS.

CORN (Rose). See PAPAVER.

CORN (Sallad). See VALERIANA.

CORN (Spurny). See SPERGULA.

CORN-LAWS. It is against the common law of England to buy or sell corn in the sheaf, before it is thrashed and measured; the reason whereof seems to be, because by such sale, the market is in effect forestalled. 3 Inst. 197.

Every person who shall sell or buy corn without measuring, or otherwise than by the Winchester measure, sealed and stricken by the brim, shall on conviction before one justice on the oath of one witness, forfeit 40s. besides

the whole of the corn so sold or bought, or the value thereof, half to the poor, and half to the informer.

On complaint to a justice, that corn has been bought, sold, or delivered, contrary to the act, the proof shall lie upon the defendant, to make it appear by oath of one witness, that he sold or bought the same lawfully: and if he shall fail therein, he shall forfeit as beforementioned, to be levied by distress and sale. 22 and 23 C. II. c. 8 and 12; and K. v. Arnold, T. 33, G. III.

And if any mayor, or other head officer, shall knowingly permit the same, he shall on conviction at the county sessions, forfeit 50*l.* half to the prosecutor and half to the poor, by distress and sale. For want of distress, to be imprisoned by warrant of the justices, till payment be made. 22 G. III. c. 8. s. 3.

The last acts now in force to regulate the returns of the prices of grain, are statutes 31 G. III. c. 30, 33 G. III. c. 65. By the former the statutes 1 Jac. II. c. 19: 1 W. and M. c. 12: 1 G. II. c. 12: 10 G. III. c. 39: 13 G. III. c. 43: 21 G. III. c. 50: and 29 G. III. c. 58, are all repealed; as also every provision in any other act regulating the importation of wheat, &c. except such as relate to the making of malt for exportation, and the exportation thereof. So much of the 15 Car. II. as prohibits the buying of corn to sell again, and the laying it up in granaries, is also repealed.

By the statutes of 31 G. III. c. 30, and 33 G. III. c. 65, bounties are granted on exportation at certain prices, and the exportation prohibited when at higher prices; the quantity of corn to be exported to foreign countries is settled; and the maritime counties of England are divided into districts. The exportation of corn is to be regulated in London, Kent, Essex, and Sussex, by the prices at the corn-exchange; the proprietors of which are to appoint an inspector of corn-returns, to whom weekly returns are to be made by the factors; and he is to make weekly accounts, and transmit the average price to the receiver of the returns, to be transmitted to the officers of the customs, and inserted in the London Gazette. The exportation in other districts, and in Scotland, to be regulated by the prices at different appointed places, for which mayors, justices, &c. are to elect inspectors. Declarations are to be truly made by factors, of corn sold by them. Orders of council may regulate importation, &c. such orders to be laid before parliament. 32 Geo. III. c. 50, and 33 Geo. III. c. 3. See also 35 Geo. III. c. 4, 44 Geo. III. c. 109, 45 Geo. III. c. 26, 46 Geo. III. c. 97, 47 Geo. III. c. 7, and Machie's Letters on the Corn Laws.

Corn. (*clavus.*) In anatomy. A hardened portion of cuticle, produced by pressure: so called, because a piece can be picked out like a corn of barley. Corns are sometimes connected with the periosteum.

Various remedies have been suggested for the cure of corns, but their removal is always attended with considerable difficulty. A correspondent in the sixty-third volume of the Gentleman's Magazine asserts, that after having been afflicted with corns for several years, he was perfectly relieved from them, by the application of brown paper moistened with spittle. It has also been recommended to wrap a clove of garlic in paper, and cover it with hot ashes till it becomes soft, when it should be applied to the parts affected, as warm as they can bear it.

Wrapping a leaf of climbing ivy about a toe, and applying a fresh one every day, has often been found exceedingly serviceable. But the best cure for these painful excrescences, in our opinion, is to wear constantly easy shoes, to bathe the feet frequently in lukewarm water, in which a little sal ammoniac and pot-ashes have been dissolved, and to apply a plaster made of equal parts of gum galbanum, saffron, and camphor. By persevering in this treatment, the complaint may in a considerable degree be alleviated, and at length totally eradicated. But we cannot omit to caution those who are troubled with corns, never to cut or pierce them with any sharp or pointed instrument; as such imprudent attempts have often been productive of dangerous consequences. Nay, it should be remarked, that every application which is liable to occasion pain to the foot or toes ought to be carefully guarded against, as being improper and unsafe. Hence the inefficacy of operations performed by pretenders, who are unacquainted with the structure of the human body: and such expedients may be aptly compared to periodical blood-lettings, which benefit the operator, but impoverish the constitution of the biassed patient, whose fluids increase, but progressively become more watery.

Corn-field. *s.* A field where corn is growing (*Shakspeare*).

Corn-floor. *s.* The floor where corn is stored (*Hosea*).

Corn-flower. *s.* A flower that grows only among corn (*Bacon*).

Corn-land. *s.* Land appropriated to the production of grain.

Corn-master. *s.* One that cultivates corn for sale: not in use (*Bacon*).

Corn-mill. *s.* A mill to grind corn into meal (*Mortimer*). See Flour-mill.

Corn-pipe. *s.* A pipe made by slitting the joint of a green stalk of corn (*Tickel*).

Corn-sallad. *s.* An herb, whose top leaves are a sallad of themselves (*Mortimer*).

CORNAGE, an ancient tenure, the service whereof was to blow a horn when any invasion of the Scots was perceived.

CORNARIUS, or Haguenbot (John), a celebrated German physician, born at Zwickow in Saxony. His preceptor made him change his name of Haguenbot to that of Cornarius, under which he is most known. At twenty years of age he taught grammar, and explained the Greek and Latin poets and orators to his scholars; and at twenty-three, was licentiate in medicine. He found fault with most of the remedies provided by the apotheca-

ries; and observing, that the greatest part of the physicians taught their pupils only what is to be found in Avicenna, Rhases, and the other Arabian physicians, he carefully sought for the writings of the best physicians of Greece, and employed about fifteen years in translating them into Latin, especially the works of Hippocrates, Aëtius, Æginetus, and a part of those of Galen. Meanwhile he practised physic with reputation at Zwickow, Francfort, Marburg, Nordhausen, and Gena, where he died of an apoplexy in 1558, aged fifty-eight. He also wrote some medicinal treatises; published editions of some poems of the ancients on medicine and botany; and translated some of the works of the fathers, particularly those of Basil, and a part of those of Epiphanius.

CORNARO (Lewis), a noble Venetian, who has rendered himself remarkable, not only for having exceeded a century, but by writing an excellent little tract on Health and long Life, which he wrote at the age of eighty-one, and which is full of excellent precepts. He died at Padua, in 1565.

Cornaro (Helena Lucretia), a learned lady of the same family, who was educated at Padua, where she obtained the degree of doctor. She divided her time between intense study and the most mortified devotion; and died in 1685. A funeral solemnity was celebrated in honour of her at Rome, of which a pompous description was printed at Padua in 1686.

CORNAVII, in ancient geography, a people of Albion, inhabiting what now constitute the counties of Warwick, Worcester. Shropshire, and Cheshire.

CO'RNCHANDLER. *s.* (*corn* and *chandler.*) One that retails corn.

CO'RNCUTTER. *s.* (from *corn* and *cut.*) A man whose profession is to extirpate corns from the foot (*Wiseman*).

CORNE, an island, ten miles long, and one wide, in the gulf of Mexico, near the coast of West Florida. Lon. 88. 32 W. Lat. 30. 11 N.

Corne', a town of France, in the department of the Mayne and Loire: seven miles E. Angers.

CORNEA OPACA. The sclerotic membrane of the eye is so called, because it is of a horny consistence and opaque. See Sclerotic membrane and Eye.

Cornea transparens. The transparent portion of the sclerotic membrane, through which the rays of light pass, is so called to distinguish it from that which is opaque. See Sclerotic membrane.

CORNEILLE (Peter), a French poet of eminence, born at Roan in 1606, and brought up to the bar, which he abandoned. His first dramatic piece was called Melite, after which he produced several celebrated performances, the most famous of which is the Cid, in 1637. In 1647 he was chosen member of the French Academy. He died in 1684.

Corneille (Thomas), brother of the above, and also a poet, a member of the French Academy, and of that of Inscriptions. He wrote several plays which were well received. They were published with those of his brother in 1738, in 11 vols. 12mo. He died in 1709, aged 84. He likewise wrote a Dictionary of Arts, in 2 vols. folio, and a Geographical and Historical Dictionary, in 3 vols. folio.

Corneille (Michael), a French painter, born at Paris in 1642. He had the king's pension, and went to Rome, where he studied with success. On his return he was chosen professor in the academy at Paris, and was employed in the great works at Versailles and Trianon. He died in 1708.

CORNEL TREE. See Cornus.

CORNELIA, daughter of Scipio Africanus, was the mother of Tiberius and Caius Gracchus. She was courted by a king, but she preferred being the wife of a Roman citizen to that of a monarch. Her virtues have been deservedly commended, as well as the wholesome principles she inculcated in her two sons. When a Campanian lady made once a show of her jewels at Cornelia's house, and entreated her to favour her with a sight of her own, Cornelia produced her two sons, saying, "These are the only jewels of which I can boast."

CORNELIAN. See Chalcedonius.

Cornelian cherry. See Cornus.

CORNELISZ (Lucas), an eminent painter of Leyden, in the sixteenth century. He came to England in the reign of Henry VIII. and was appointed principal painter to that monarch. At Penshurst, in Kent, are the portraits of the constables of Queenborough castle, from the reign of Edward III. to Henry VIII. painted by him. (*Watkins*).

CO'RNEMUSE. *s.* (Fr.) A kind of rustick flute.

CO'RNEOUS. *a.* (*corneus*, Latin.) Horny; of a substance resembling horn (*Brown*).

Corneous mercury. See Hydrargyrum and Mercury.

Corneous silver ore. See Argentum and Silver.

CO'RNER. *s.* (*cornel*, Welsh.) 1. An angle. 2. A secret or remote place (*Proverbs*). 3. The extremities; the utmost limit (*Dryden*).

Co'rner-stone. *s.* The stone that unites the two walls at the corner; the principal stone (*Howel*).

CORNERED or angular stem. In botany. Three-sixth cornered trigonus, &c. Having three, &c. prominent longitudinal angles.

CO'RNERWISE. *ad.* (*corner* and *wise.*) Diagonally; with the corner in front.

CO'RNET. *s.* (*cornette*, French.) 1. A musical instrument blown with the mouth (*Bacon*). 2. A company or troop of horse (*Clarendon*). 3. The officer that bears the standard of a troop. 4. Cornet *of a Horse*, is the lowest part of his pastern, that runs round the coffin. 5. A scarf anciently worn by doctors.

Cornet. A wind instrument now but little known, having more than a century since

given place to the hautboy. There were three kinds of cornets, the treble, the tenor, and the bass. The treble and tenor cornets were simple curvilineal tubes, about three feet in length, gradually increasing in diameter from the mouth-piece towards the lower end. The bass cornet was a serpentine tube four or five feet long, and increasing in diameter in the same manner. The figures are given in Plate 40. See also SERPENT.

CORNET-STOP, on an organ, is a compound treble stop, in the use of which, each finger-key acts upon, and occasions five pipes to sound at the same time, viz. one in unison with the note proper to that finger key (and also with the same note in the stop, called diapason), another which is tuned a true major third above it, another a fifth, another an eighth, and the uppermost a true major seventeenth above the note.

CO'RNETTER. *s.* (from *cornet.*) A blower of the cornet (*Hakewill*).

CORNICHE, CORNISH, or CORNICE, in architecture, the uppermost member of the entablature of a column, or that which crowns the order. The word is formed from the Latin *coronis*, a crowning.

The corniche is different in the several orders. In the Tuscan order it is the most plain, consisting of an ovum, or quarter round, an astragal, the fillet, the larmici, and the tabon. In the Doric, we have capitals to the triglyphs of the freeze with their bandelettes, a talon, mutules, or dentils; a larmier, with its guttæ underneath, a talon, fillet, cavetto, and reglet. In the Ionic, the members are in most respects the same as in the Doric; except that they are frequently enriched with carving, and there are always dentils. In the Composite there are dentils; its mouldings are carved, and there are channels under the fossit. The Corinthian corniche is the richest; and is distinguished by having both medillions and dentils: contrary to the opinion of Vitruvius, who looks on those two ornaments as incompatible; and of M. le Clerc, who regards the dentils as peculiar to the Ionic.

CORNICHE is also used, in the general, for any little projecture, either of masonry, or joinery; even where there are no columns.

CO'RNICLE. *s.* (from *cornu*, Latin.) A little horn (*Brown*).

CORNICULA, an instrument formerly made of horn, to answer the purpose of the present cupping-glass.

CORNICULARIUS, in antiquity, an officer in the Roman army, whose business was to aid and assist the military tribune in quality of lieutenant.

CORNICULATE FLOWERS. See FLOWERS.

CORNI'GEROUS. *a.* (*corniger*, Latin.) Horned; having horns (*Brown*).

CORNISH CHOUGH. In zoology. See CORACIAS.

CORNO. (from the Italian.) A French horn.

CO'RNU. In botany. A horn or spur at the back of some flowers. See HORN.

CORNU AMMONIS. In anatomy. Cornu arietis. When the pes hippocampi of the human brain is cut transversely through, the cortical substance is so disposed as to resemble a ram's horn. This is the true cornu ammonis, though the name is often applied to the pes hippocampi.

CORNU ARIETIS. See CORNU AMMONIS.

CORNU CERVI. Hartshorn. The horns of several species of stag, as the cervus alces, cervus dama, cervus elaphus, and cervus taranda, are used medicinally. Boiled, they impart to the water a nutritious jelly, which is frequently served to the table, and given in diseases: but the chief use of the horns is for calcination; to afford the liquor volatilis cornu cervi, ammoniac, the carbonat of ammoniac, &c. which are in frequent use as important articles in the materia medica.

CORNU CERVI CALCINA'TUM. See CORNU CERVI USTUM.

CORNU CERVI USTUM. Cornu cervi ustum. Burnt hartshorn shavings possess absorbent, antacid, and adstringent properties, and are given in form of decoction, as a common drink in diarrhœas, pyrosis, &c.

CORNUA. (*cornu*, *cornua.*) Warts. Horny excrescences, which mostly form on the joints of the toes. Similar diseased productions have been known to arise on the head and other parts.

CORNUCOPIA, among the ancient poets, a horn, out of which proceeded plenty of all things; by a particular privilege which Jupiter granted his nurse, supposed to be the goat Amalthea. In architecture and sculpture, the cornucopia is represented under the figure of a large horn; out of which issue fruits, flowers, &c.

CORNU'COPIÆ. In botany. A genus of the class triandria, order digynia. Involucre one-leaved, funnel-form, crenate, many-flowered; calyx two-valved; corol one-valved. Two species: natives of Italy and the East.

CORNUS. Dogwood. Cornel. In botany. A genus of the class tetandria, order monogynia. Calyx four-toothed, with often a four-leaved involucre; corol four-petalled, superior; drupe with a two-celled nut. Twelve species; natives of Europe, Asia, or America; of which one or two species are indigenous to our own country. Some of these are furnished with an involucre, and umbelled; others are cymed and devoid of involucre. The species chiefly found wild in our own country, and occupying our hedges, is,

1. C. sanguinea, or common dogwood, with an upright tree-stem, ten or twelve feet high, straight branches; ovate leaves, green on both sides; cymes naked and flat: umbellate white flowers, succeeded by black berries.

Of the rest, we can only mention,

2. C. mascula; a native of Europe. An arboreous plant, with umbels equalling the involucres, and yellowish-green flowers. The

Cornus Canadensis.
Canadian Cornel.

Cypripedium Parviflorum
Yellow Ladies Slipper.

London, Publish'd by Geo. Kearsley, Fleet Street Dec. 1. 1808.

Drawn from Nature by S. Edwards.

stem rises twenty feet high; and the flowers are succeeded by a red, cherry-like, esculent fruit, of a subacid taste: whence this species is called cornelian-cherry.

3. C. japonica. Arboreous; umbels exceeding the involucres; leaves serrate: white terminal flowers.

4. C. alternifolia: a North American plant, with dark, purple branches, with a few white dots or lines; leaves ovate, acute, entire, pale underneath; stipuleless, calyxless; corymbed, white panicle.

Several of the species of this plant are extremely beautiful and elegant; especially c. suecica, and c. Canadensis, of which last we have given a coloured drawing. See Botany, Plate LVIII. It was introduced from America by Dr. John Fothergill, in 1774; flowers in August; is propagated by its creeping roots: requires a shady situation, and light soil, composed chiefly of bog-earth.

CORNUTE. In botany. Horn-shaped.

To CORNU'TE. *v. a.* (*cornutus*, Latin.) To bestow horns; to cuckold.

CORNU'TED. *a.* (*cornutus*, Lat.) Grafted with horns; cuckolded.

CORNUTIA. In botany. A genus of the class didynamia, order angiospermia. Calyx five-toothed; stamens longer than the corol; style very long; berry one-seeded. Two species; Caribbees and America.

1. C. pyramidala, with naked, elongated, terminal panicle, blue flowers, and hoary leaves, rising ten or twelve feet.

2. C. punctata. A shrub with axillary tricotomous corymbs, opposite, ovate, painted slightly; serrate leaves; blue flowers, with small white dots.

CORNU'TO. *s.* (from *cornutus*, Latin.) A man horned; a cuckold (*Shakspeare*).

CORNUTUM ARGUMENTUM. See DILEMMA.

CORNWALL, a county which forms the S.W. extremity of Great Britain. It is bounded on the E. by the river Tamar, which parts it from Devonshire; on the S. by the English channel, and on the N.W. by St. George's channel. Its length from E. to W. is ninety miles; its breadth next to Devonshire, is above fifty; but it soon contracts, and at St. Ives does not exceed five: it then spreads a little to the S. and S.W. and terminates in two points, one of which is called the Lizard, and the other the Land's End. It is in the diocese of Exeter, and contains 9 hundreds, 27 market-towns, and 161 parishes; and it sends 44 members to parliament. The air is sharp and healthful to the natives; yet the vicinity of the sea exempts this country from hard frosts, and the snow never lies long on the ground.

This county contains about 970,240 acres, nearly 257,000 of which are uncultivated, including woodlands. The inhabitants amount to 188,270, about 16,000 of whom are employed in the mines. It furnishes 647 men to the national militia. Cornwall derives its chief importance from its mines; those of tin and copper are very numerous. The annual produce of tin for seven years, from 1786 to 1792, both inclusive, was about 22,000 blocks, valued at nearly ten guineas per block, exclusive of duties; affording a produce of 330,000*l*. The produce of the whole of the copper-mines is about 40,000 tons of ore annually; and these produce about 4,700 tons of copper. The annual amount is stated at 320,000*l*. There are also some lead mines, and an abundance of iron ore, many tons of which have been lately sent to Wales. Native gold has been found in some stream-works, and likewise, but more minutely blended, in some mines of tin. The king's eldest son is born duke of Cornwall, and derives a revenue, not only from lands appertaining to the duchy, but from the mines of tin and copper.

CO'RNY. *a.* (from *cornu*, horn, Latin.) 1. Strong or hard like horn; horny (*Milton*). 2. (From *corn*.) Producing corn (*Prior*).

CORODY, CORRODY, or CORREDY. In law. (*corrodium*, from *corrodo*, also *conredium* and *corredium*.) A sum of money, or allowance of meat, drink, and clothing, due to the king from an abbey, or other house of religion, whereof he is the founder, towards the reasonable subsistence of any servant he thinks fit to bestow it on.

COROL, or COROLLA. In botany. (dimin. from *corona*, a crown.) Liber plantæ in flore præsens. Philos. Bot. et Delin. Pl. Tegmentum interius floris e libro. Regn. Veg. The second of the seven parts of fructification; or, the inner covering of the flower, formed, according to Linnéus, of the liber or inner bark of the plant.

It may commonly be distinguished from the perianth, by the fineness of its texture and the gayness of its colours: whereas the perianth is usually rougher and thicker, and green. But there are many exceptions; the perianth in bartsia is coloured; the corol in daphne laureola is green. Linnéus makes the distinction between the corol and perianth to consist, in the former having its segments or petals alternate with the stamens; while the latter has its parts or leaflets opposite to them. This appears from the inspection of the classes tetrandria and pentandria, in flowers which have both parts; and of chenopodium, urtica, parietaria, which have no corol. See Philos. Bot. p. 57, § 90.

Adanson however observes, that in the liliaceous plants, what is called a corol, is in reality a perianth, according to the principles of Linnéus. That part which is named corolla of rhamnus, in Linnéus's Genera, is called calyx in Systema Vegetabilium; and on the contrary, the calyx or perianth of polygonum in Lin. Gen. is the corol in Syst. Veg.

To get rid of the difficulty, which sometimes occurs in distinguishing the corol from the calyx, De Necker has cut the knot, and called them by one name, perigynanda; which signifies the envelope, cover, or wrapper of the stamens and pistils: this he distinguishes into inner and outer; when there are two, then

CO'RPORATE. *a.* (from *corpus*, Latin.) 1 United in a body or community (*Swift*) 2. General; united (*Shakspeare*).

CO'RPORATENESS. *s.* The state of a body corporate; a community.

CORPORATION, a body politic, or incorporate, so called because the persons or members are joined into one body, and are qualified to take and grant, &c. Corporations are either spiritual or temporal: spiritual, as bishops, deans, archdeacons, parsons, vicars, &c. Temporal, as mayor, commonalty, bailiff, burgesses, &c. And some corporations are of a mixed nature, composed of spiritual and temporal persons, such as heads of colleges and hospitals, &c. All corporations are said to be ecclesiastical or lay: ecclesiastical are either regular, as abbeys, priories, chapters, &c. or secular, as bishoprics, deaneries, archdeaconries, &c.; lay, as those of cities, towns, companies, or communities of commerce, &c.

Corporations may be established three different ways, viz. by prescription, letters patent, or act of parliament; but are most commonly established by patent or charter. London is a corporation by prescription: but though corporations may be by prescription, yet it shall be intended, that it did originally derive its authority by a grant from the king.

A corporation may be dissolved; for it is created upon a trust, and if it be broken, it is forfeited. No person shall bear office in any corporation but such as have received the sacrament, taken oaths, &c. and none are to execute in a corporation for more than a year. A corporation cannot sue or appear in person, but by an attorney.

Ordinances made by corporations, to be observed on pain of imprisonment, forfeiture of goods, &c. are contrary to Magna Charta. Actions arising in any corporation may be tried in the corporation courts; but if they try actions not within their jurisdictions, and encroach upon the common law, they are liable to be punished for it. The corporation of the city of London is to answer for all particular misdemeanours committed in any of the courts of justice within the city, and for all other general misdemeanors committed in the city.

CO'RPORATURE. *s.* (from *corpus*, Lat.) The state of being imbodied.

CORPO'REAL. *a.* (*corporeus*, Lat.) Having a body; material; not spiritual (*Tillotson*).

CORPORE'ITY. *s.* (from *corporeus*, Lat.) Materiality; bodiliness (*Stillingfleet*).

CORPORIFICA'TION. *s.* (from *corporify*.) The act of giving body or palpability.

To CO'RPORIFY. *v. a.* (from *corpus*, Lat.) To imbody: not used (*Boyle*).

CORPS. Corpse. *s.* (*corps*, French.) 1. A body (*Spenser*). 2. A carcase; a dead body; a corse (*Addison*). 3. The body, in opposition to the soul. 4. A body of forces.

Corps. In architecture. (from the French.) Any part projecting beyond the naked front of a wall, and serving as a ground for an ornament.

CO'RPULENCE, Co'rpulency. *s.* (*corpulentia*, Latin.) 1. Bulkiness of body; fleshiness (*Donne*). 2. Spissitude; grossness of matter (*Ray*).

CORPULENCY, or Obesity, in physiology, is the accumulation of too great a quantity of fat or animal oil, which distends the solids to an unnatural degree, by the abundance of granulated matter collected in the cellular membrane.

Corpulency arises from a variety of causes, which may operate separately, or conjointly in the same constitution. It may, however, be principally ascribed, 1. To the introduction of too much oil into the habit, through the channels of nourishment, by which means it is retained in too large a quantity. 2. An overlaxity, or, perhaps, too large a structure of the cells in which it is deposited, so as to admit and retain an immoderate proportion of unctuous matter. 3. To a peculiar disposition of the blood, which renders it liable to separate too easily from its oleaginous particles, and to admit of their being strained off too plentifully by the secretory vessels; or, lastly, to a defective evacuation or expulsion of oil already absorbed, separated from the blood, and deposited in its cells, instead of being discharged through the different emunctories of the body.

Obesity is promoted by whatever tends to soften the blood, and render it less sharp and saline; such as want of exercise and motion, an indolent life, indulgence in too much sleep, &c. It may be removed or prevented by the contrary causes, and particularly by the use of saline and acid food and drink.

Castile soap has often been employed with success, and is strongly recommended in a discourse on the Causes, Nature, and Cure of Corpulency, by Dr. Flemyng, 8vo. 1760; who directs from one to four drams to be dissolved in a gill or more of soft water, and to be taken every night previously to going to repose.

CO'RPULENT. *a.* (*corpulentus*, Latin.) Fleshy; bulky (*Ben Jonson*).

CO'RPUS ANNULA'RE. A synonym of pons Varolii. See Pons Varolii.

Co'rpus callo'sum. Commissura magna cerebri. The white medullary part joining the two hemispheres of the brain, and coming into view under the falx of the dura mater when the hemispheres are drawn from each other. On the surface of the corpus callosum two lines are conspicuous, called the raphe.

Co'rpus luteum. The granulous papilla which is found in that part of the ovarium of females; whence, upon the theory of evolution, an ovum is supposed to have proceeded: hence, it is said, that their presence determines that the female has been impregnated; and the number of the corpora lutea corresponds with the number of impregnations. It is, however, asserted by a modern writer, that corpora lutea have been detected in young virgins, where no impregnations could possibly have taken place.

Corpus muco'sum. See Rete mucosum.

Corpus pampinifo'rme. (*pampiniformis*, from *pampinus*, a tendril, and *forma*, likeness, resembling a tendril.) Applied to the spermatic chord, and thoracic duct also. The

plexus of veins surrounding the spermatic artery in the cavity of the abdomen.

CORPUS RETICULA'RE. See RETE MUCOSUM.

CORPUS SPONGIO'SUM URETHRÆ. Substantia spongiosa urethræ. Corpus spongiosum penis. This substance originates before the prostate gland, surrounds the urethra, and forms the bulb; then proceeds to the end of the corpora cavernosa, and terminates in the glans penis, which it forms.

CORPUS CHRISTI, a festival of the church of England, kept on the next Thursday after Trinity Sunday, instituted in honour of the eucharist; to which also one of the colleges of Oxford, and one at Cambridge, are dedicated.

CORPU'SCLE. *s.* (*corpusculum*, Lat.) A small body; an atom (*Newton*).

CORPU'SCULAR. CORPUSCULA'RIAN. *a.* (from *corpusculum*, Latin.) Relating to bodies; comprising bodies (*Boyle*).

CORPUSCULAR PHILOSOPHY, that scheme or system of physics, wherein the phenomena of bodies are accounted for, from the motion, rest, position, arrangement, &c. of the minute corpuscles, or atoms, whereof bodies are composed.

The corpuscular philosophy, which has of late flourished so much under the title of the mechanical philosophy, is exceedingly ancient. Leucippus and Democritus were the first who taught it in Greece; from them Epicurus received it, and improved it, insomuch that it came at length to be denominated from him, and was called the Epicurean philosophy. Of this an admirable account has been given by Mr. Good in his Translation of Lucretius I. cviii—cxi. See also, farther, our article EPICUREAN PHILOSOPHY.

Leucippus, again, is said to have received it from Mochus, a Phœnician physiologist, before the time of the Trojan war, and the first who philosophized about atoms: though Gale, who borrows all profane philosophy from the sacred philosophy in the books of Moses, is of opinion, that he might take the hint from the Mosaic history of the formation of man out of the dust of the earth.

Indeed, Casaubon takes Μωχος, or Μοχος, to be the name of a Tyrian, who among his own countrymen was called משה, Mosche, or according to the method of writing which then obtained, Moses: whence it is conjectured that the Mosche, or Moschus of the Tyrians, was, in effect, the Moses of the Hebrews.

This appears to be the sentiment of Selden, Arcerius, &c. But the opinion of Bochart is more probable, who from Posidonius and others, takes Mochus for an inhabitant of Sidon, and his philosophy to be nothing else than a physiological or natural history of the creation.

Mr. Boyle reduces the principles of the corpuscular philosophy to the four following heads,

1. That there is but one catholic, or universal matter, which is an extended, impenetrable, and divisible substance, common to all bodies, and capable of all forms.

This sir Isaac Newton finely improves on: "All things considered (says that great author), it appears probable to me, that God, in the beginning, created matter in solid, hard, impenetrable, moveable particles; of such sizes and figures, and with such other properties, as most conduced to the end for which he formed them: and that these primitive particles, being solids, are incomparably harder than any of the sensible porous bodies compounded of them; even so hard as never to wear, or break in pieces: no other power being able to divide what God made one in the first creation. While these corpuscles remain entire, they may compose bodies of one and the same nature and texture in all ages: but should they wear away, or break in pieces, the nature of things depending on them would be changed: water and earth, composed of old worn particles, and fragments of particles, would not be of the same nature and texture now, with water and earth composed of entire particles at the beginning. And therefore, that nature may be lasting, the changes of corporeal things are to be placed only in the various separations, and new associations, of these permanent corpuscles."

2. That this matter, in order to form the vast variety of natural bodies, must have motion in some, or all its assignable parts; and that this motion was given to matter by God, the creator of all things; and has all manner of directions and tendencies.

"These corpuscles (says sir Isaac Newton), have not only a vis inertiæ, accompanied with such passive laws of motion as naturally result from that force; but also are moved by certain active principles; such as that of gravity, and that which causes fermentation, and the cohesion of bodies."

3. That matter must also be actually divided into parts; and each of these primitive particles, fragments, or atoms of matter, must have its proper magnitude, figure, and shape.

4. That these differently sized and shaped particles have different orders, positions, situations, and postures, from whence all the variety of compound bodies arises.

Some of the recent discoveries, especially those in chemistry, crystallization, &c. cast considerable doubts upon the guesses of Newton and his contemporaries, relative to this intricate subject.

To CORRA'DE. *v. a.* (*corrado*, Latin.) To rub off; to scrape together.

CORRADIA'TION. *s.* (*con* and *radius*, Latin.) A conjunction of rays in one point (*Bacon*).

CORREA. In botany. A genus of the class octandria, and order monogynia: calyx campanulate, four-toothed; petals four, reflected at the ends; capsule four-celled, four-valved, with a single seed in each. One species, the alba, a shrub, is a native of Port Jackson.

To CORRE'CT. *v. a.* (*correctum*, Latin.) 1. To punish; to chastise; to discipline. 2. To amend; to take away faults (*Rogers*). 3. To obviate the qualities of one ingredient by another (*Prior*). 4. To remark faults.

Corre'ct. *a.* (*correctus*, Latin.) Revised or finished with exactness; accurate (*Felton*).

CORRE'CTION. *s.* (from *correct.*) 1. Punishment; discipline; chastisement. 2. Act of taking away faults; amendment (*Dryden*). 3. That which is substituted in the place of any thing wrong (*Watts*). 4. Reprehension; animadversion (*Brown*). 5. Abatement of noxious qualities, by the addition of something contrary (*Donne*).

Correction, in printing, the pointing out or discovering the faults in a printed sheet, in order to be amended by the compositor before it be printed off.

The corrections are placed on the margin of every page, against the line in which the faults are found; and there are different characters used to express different corrections: thus ♆ is put for dele, to intimate that something, as a point, letter, word, &c. dashed in that line is to be taken out. If any thing is to be inserted, the place is to be marked thus ʌ, and the thing to be inserted added in the margin. When there are two or more corrections in the same line, then they are all separated in the margin by little bars, thus |. If a space is omitted, its place is marked with a caret, and in the margin thus #. When a letter is inverted, it is expressed in the margin thus ꝺ. When any thing is to be transposed, it is directed thus, Extraordinary scarce ever fail of attainments exciting envy, for Extraordinary attainments scarce ever fail of exciting envy, and in the margin is added *tr.* If Italic characters are to be changed for Roman, or vice versa, a line is drawn thus — under the letters, and Rom. or Ital. is written in the margin. If a space, or an m or n quadrat, stick up, and print black, it is marked in the margin with a dash, thus |. If a word, sentence, or paragraph is entirely omitted, the place is marked with a caret, and in the margin is put the word *out*. If the letters of a word stand too far asunder, a line is drawn under them, and in the margin is put a crooked line or hook, thus ◡. There are many other marks used in correcting, as ✓ for superior; *cap.* for capital, *l. c.* for lower-case, &c.

Correction of a fluent. See Fluxions.

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CORRESPO'NDENCE. Correspo'ndency. *s.* (from *correspond.*) 1. Relation; reciprocal adaptation of one thing to another (*Locke*). 2. Intercourse; reciprocal intelligence (*King Charles*). 3. Friendship; interchange of offices or civilities (*Bacon*).

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CO'RRIGIBLE. *a.* (from *corrigo*, Latin.) 1. That may be altered or mended. 2. Punishable (*Howel*). 3. Corrective: not in use (*Shakspeare*).

CORRIGIOLA. Strapwort. In botany. A genus of the class pentandria, order digynia. Calyx inferior, five-leaved; petals five; seed one, obscurely three-sided. Two species; one common to our own sea-coasts, with peduncled flowers; calyxes with a membranaceous edge: the other, a Cape plant, with sessile flowers; calyxes entirely green.

CORRI'RA. Courier. In zoology. A genus of the class aves, order grallæ. Bill short, straight, without teeth: thighs longer than the body; feet four-toed, palmate: the hind-toe not connected. One species only; inhabits Italy; is less than the curlew, and runs swiftly.

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CORRI'VALRY. *s.* (from *corrival.*) Competition; opposition.

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CORROBORANTS. (*corroborantia medicamenta.*) Medicines, or whatever gives strength to the body, as bark, wine, beef, cold bath, &c.

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CORRO'DENT. *a.* (from *corrode.*) Having the power of corroding or wasting away.

CORRODIBI'LITY. *s.* (from *corrodible.*) Possibility to be consumed by a menstruum.

CORRO'DIBLE. *a.* (from *corrode.*) Possible to be consumed or corroded (*Brown*).

CO'RRODY. *s.* (*corrodo*, Latin.) A defalcation from an allowance or salary (*Ayliffe*).

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CORRO'SIBLENESS. *s.* (from *corrosible.*) Susceptibility of corrosion.

CORRO'SION. *s.* (*corrodo*, Latin.) The power of eating or wearing away by degrees (*Woodward*).

CORRO'SIVE. *a.* (from *corrodo*, Latin.) 1. Having the power of wearing away (*Grew*). 2. Having the quality to fret or vex (*Hooker*).

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Corrosive muriat of mercury. See Hydrargyrus and Hydrargyrus muriatus.

Corro'sive sublimate. See Hydrargyrus muriatus.

Corro'sives. (*corrosiva*, from *corrodo*, to eat away.) See Escharotics.

CORRO'SIVELY. *ad.* (from *corrosive.*) 1. Like a corrosive (*Boyle*). 2. With the power of corrosion.

CORRO'SIVENESS. *s.* The quality of corroding or eating away; acrimony (*Donne*).

CORRUDA. See Asparagus.

CO'RRUGANT. *a.* (from *corrugate.*) Having the power of contracting into wrinkles.

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CORRUGATOR SUPERCILII. (*corrugator*, from *corrugo*, to wrinkle.) Musculus supercilii of Winslow. Musculus frontalis verus, seu corrugator of Douglas. A small muscle situated on the forehead. When one muscle acts, it is drawn towards the other, and projects over the inner canthus of the eye. When both muscles act they pull down the skin of the forehead, and make it wrinkle, particularly between the eyebrows.

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To Corru'pt. *v. n.* To become putrid; to grow rotten; to lose purity (*Bacon*).

Corru'pt. *a.* (from *to corrupt.*) 1. Spoiled; vitiated in its qualities (*Knolles*). 2. Unsound; putrid (*Spenser*). 3. Vitious; tainted with wickedness (*South*).

CORRU'PTER. *s.* (from *corrupt.*) He that taints or vitiates (*Addison*).

CORRUPTIBI'LITY. *s.* (from *corruptible.*) Possibility to be corrupted.

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CORRU'PTIBLY. *ad.* (from *corruptible.*) In such a manner as to be corrupted (*Shakspeare*).

CORRU'PTION. *s.* (*corruptio*, Latin.) 1. The principle by which bodies tend to the separation of their parts. 2. Wickedness; perversion of principles (*Addison*). 3. Putrescence (*Blackmore*). 4. Matter or pus in a sore. 5. The tendency to a worse state (*Shakspeare*). 6. Cause, or means, of depravation (*Raleigh*).

Corruption of blood, in law, an infection accruing to a man's state, attainted of felony and treason, and to his issue; for as he loses all to the prince, &c. his issue cannot be heirs to him, or to any other ancestor by him; and if he were noble his heirs are rendered ignoble.

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CORSA. In architecture. See Platband.

CORSAIR, a pirate or person who scours the seas, especially the Mediterranean, with a vessel armed for war, without commission from any prince or power, to plunder merchant vessels. The word comes from the Italian *corsare*, of *corso*, or *à cursibus*, by reason of their courses, or excursions. The name is commonly given to the piratical cruisers of Barbary, who had their rise about the beginning of the 16th century.

CORSE. *s.* (*corpse*, French.) 1. A body: not in use (*Spenser*). 2. A dead body; a carcase (*Addison*).

CORSELET, a little cuirass: or, according to others, an armour or coat made to cover the whole body, anciently worn by the pike-men, usually placed in the front and flanks of the battle, for the better resisting the enemy's as-

Corre'ct. *a.* (*correctus*, Latin.) Revised or finished with exactness; accurate (*Felton*).

CORRE'CTION. *s.* (from *correct.*) 1. Punishment; discipline; chastisement. 2. Act of taking away faults; amendment (*Dryden*). 3. That which is substituted in the place of any thing wrong (*Watts*). 4. Reprehension; animadversion (*Brown*). 5. Abatement of noxious qualities, by the addition of something contrary (*Donne*).

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CORSE. *s.* (*corpse,* French.) 1. A body: not in use (*Spenser*). 2. A dead body; a carcase (*Addison*).

CORSELET, a little cuirass: or, according to others, an armour or coat made to cover the whole body, anciently worn by the pike-men, usually placed in the front and flanks of the battle, for the better resisting the enemy's as-

saults, and guarding the soldiers placed behind them.

CORSEPRESENT, in ancient writers, a mortuary.

CORSHAM, or COSHAM, a town in Wilts. The Saxon king Ethelred had a palace here. Edmund, earl of Cornwall, in the reign of Edward I. obtained a charter for a market; and the inhabitants still enjoy some privileges granted them by Richard, his predecessor. Their chief support is the woollen manufacture, here being some considerable clothiers. This place is four miles S.W. of Chippenham.

CORSICA, an island of the Mediterranean sea; it is situated between 41 deg. 20 min. and 42 deg. 58 min. of N. lat. and between 8 deg. 38 min. and 9 deg. 37 min. of E. lon. The air of this island is more wholesome than that of its neighbour Sardinia; but its soil is rather barren. It, however, produces sufficient quantities of corn and wine for the exigencies of the natives. The language is the Italian. The Corsicans were greatly oppressed during the time that the island was subject to the Genoese. Every governor the republic of Genoa sent into the several provinces of this island, used to condemn the Corsicans to death without any legal trial, saying, that they did it *informata conscientia*. On account of the oppression of the Genoese, the Corsicans revolted, and put themselves under general Paoli, under whose government, justice was impartially administered; commerce with all parts of Italy, and with other nations, was revived, and made to flourish; agriculture was encouraged; education carefully cultivated; and the proud city of Genoa itself was attacked almost at the entrance of its ports. All these circumstances determined the Genoese to give up to France what they themselves no longer possessed. Notwithstanding this, the Corsicans had still the courage to defend themselves against so powerful a nation during thirteen months, and were most frequently victorious in the several actions they fought with their new usurpers. After the French revolution, in 1789, Corsica was admitted as an eighty-third department of France, at the particular request of a deputation, of which Paoli was at the head. In consequence, however, of some events which followed the revolution of 1792, Paoli revolted; the French, by the assistance of the English, were expelled from the island; and Corsica, on June 19, 1794, was declared annexed to the crown of Great Britain, according to a new constitution which had been previously formed. In October 1796, however, the English found it expedient to evacuate the island, of which the French immediately took possession, and again united it to their republic, dividing it into two departments, Gols and Liamone, of the former of which Bastia is the chief town, and of the latter Ajaccio. Napoleon Bonaparte, the present emperor of France, is a native of this island.

CORSINI (Edward), an Italian monk, born at Fanano in 1702, and died in 1765, at Pisa, where he was professor of philosophy. He wrote, 1. Philosophical and Mathematical Institutions, six vols. 8vo. 2. Elements of Practical Geometry, two vols. 8vo. 3. Fasti of the Archons of Athens. 4. A Course of Metaphysics. 5. Some Tracts on Grecian Antiquities.

CORSNED, or MORSEL OF EXECRATION, a species of trial or purgation anciently in use among us. It consisted of a piece of cheese or bread, about an ounce in weight, which was consecrated with a form of exorcism; desiring of the Almighty that it might cause convulsions and paleness, and find no passage if the man was really guilty; but might turn to health and nourishment if he was innocent. This corsned was then given to the suspected person, who at the same time also received the holy sacrament. Our historians assure us, that Godwin, earl of Kent, in the reign of king Edward the Confessor, abjuring the death of the king's brother, at last appealed to his corsned, "*per buccellam deglutiendam abjuravit*," which stuck in his throat and killed him. This custom has been long since gradually abolished, though the remembrance of it still subsists in certain phrases of abjuration retained among the common people: as, "I will take the sacrament upon it; May this morsel be my last!" and the like.

CORTAN, in commerce, a Spanish measure, sixteen of which make a larga of wine or brandy, or about thirty gallons English.

CORTES OF SPAIN, a term purely Spanish, signifying the courts, i. e. the states, or assembly of the states, at Madrid.

CORTES, or CORTEZ (Ferdinand), a Spanish general, famous for the conquest of Mexico, and other victories over the natives of South America; but infamous for the cruelties he committed upon the vanquished, without regard to rank, age, or sex. It probably was on this account he was but coolly received on his return to Europe by his royal master Charles le Quint: it is even asserted that the emperor asked him who he was? To which Cortez replied; "I am the man who gave you more provinces than your ancestors have left you towns." He died in 1554, aged 63.

CORTEX, (from *corium*, a hide, and *tego*, to cover.) In a looser sense, implies bark of any kind: but in a more strict botanical import, the outer bark of a vegetable, or the second integument within the epidermis; plated, lax, dry, hard, often in chinks.

CORTEX ANGELI'NÆ. The bark of a tree growing in Grenada. A decoction of it is recommended as a vermifuge. It excites tormina, similar to jalap, and operates by purging.

CORTEX ANGUSTU'RÆ. See ANGUSTURÆ CORTEX.

CORTEX BELA-AYE. See BELA-AYE CORTEX.

CORTEX CANELLÆ MALABRICÆ. See CASSIA LIGNEA.

CORTEX CARDINALIS DE LUGO. The Peruvian bark was so called, because the car-

dinal Lugo had testimonials of above a thousand cures performed by it in the year 1653.

Cortex chinæ regius. See Cinchona cortex peruvianus flavus.

Cortex chinæ surinamensis. This bark is remarkably bitter, and preferable to the other species in intermittent fevers.

Cortex chinchinæ. See Cinchona.

Cortex eluthe'riæ. See Cascarillæ cortex.

Cortex geoffro'yæ jamaicensis. Bulge-water-tree bark. The bark of the Geoffroya jamaicensis; inermis foliolis lanceolatis, of Swartz. It is principally used in Jamaica, and with great success as a vermifuge. See Geffroya.

Cortex lavola. The bark bearing this name, is supposed to be the produce of the tree which affords the anisum stellatum. Its virtues are similar.

Cortex magellanicus. See Winteranus cortex.

Cortex massoy. The produce of New Guinea, where it is beaten into a pultaceous mass with water, and rubbed upon the abdomen to allay tormina of the bowels. It partakes of the smell and flavour of cinnamon.

Cortex peruvianus. See Cinchona.

Cortex peruvianus ruber. See Cinchona cortex peruvianus ruber.

Cortex pocgerebæ. This bark is sent from America; and is said to be serviceable in diarrhœas, dysenteries, and hepatic fluxes.

Cortex winteranus. See Winteranus cortex.

CO'RTICAL. *a.* (*cortex*, bark, Latin.) Barky; belonging to the rind (*Cheyne*).

Co'rtical bud. (*corticalis gemma.*) Having its origin from the scales of the bark—e corticis ramentis.

Co'rtical substance. Substanctia corticalis. Cineritious substance. The external substance of the brain is of a darker colour than the internal, and surrounds the medullary substance, as the bark does the tree; hence it is termed *cortical.* See also Kidney.

CO'RTICATED. *a.* (from *corticatus*, Lat.) Resembling the bark of a tree (*Brown*).

CO'RTICOSE. *a.* (*corticosus*, Latin.) Full of bark.

CORTONA, a town of Tuscany, in Italy. It is the see of a bishop, and the seat of a famous academy. Lat 43. 20 N. Lon. 12. 0 E.

CO'RTUSA. Bear's-ear sanicle. In botany, a genus of the class pentandria, order monogynia. Corol wheel-shaped, with an elevated ring in the throat; capsule one-celled oval, five-valved at the top: stigma simple. Two species only; one a native of the Alps, the other of Siberia: both low herbaceous perennials, the former with umbelled, red flowers; the latter with white flowers. They may be easily propagated by slips in October.

CORVET, or Curvet, (from the Italian *corvetto*, a crow); in the *manege*, an air, resembling the hops of a crow, in which the horse's legs are raised higher than in the demivolt; being a kind of leap up and a little forwards, wherein the horse raises both his fore-legs at once, equally advanced (when he is going strait forward, and not in a circle); and as his forelegs are falling, he immediately raises his hind-legs, equally advanced, and not one before the other: so that all his four legs are in the air at once; and as he sets them down, he marks but twice with them.

CORUNDUM. See Adamantinus and Gemma.

CORUNNA, called by the English sailors the Groyn, a sea-port town of Galicia, in Spain. Lat. 43. 13 N. Lon. 8. 19 W. This place is now rendered memorable by the death of that excellent general sir John Moore, on Jan. 16, 1809; after an able retreat in which with consummate ability he delivered 30,000 British soldiers from the snare and grasp of Bonaparte, into which they had been precipitated by blind and incapable counsels at home.

CORVO, the most northerly of the Azore islands in the Atlantic, about four leagues in circumference, with a small port; and containing about 500 inhabitants. It is said to have derived its name from the number of crows found there on the first discovery. Lon. 31. 6 W. Lat. 39. 42 N.

CORVORANT. In ornithology. See Pelicanus.

Corvorant's-foot. See Strombus.

CORUNDUM, in mineralogy. See Adamantinus.

CORUS, Omer, Homer, or Chomer, in the Jewish antiquities, a measure containing 10 baths, or 75 gallons and 5 pints, as a measure for things liquid, and 32 pecks and one pint, as a measure for things dry.

CORU'SCANT. *a.* (*corusco*, Latin.) Glittering by flashes; flashing.

CORUSCATION, a glittering or gleam of light issuing from any thing. It is chiefly used for the electrical fluid when rendered visible, as in a flash of lightning, &c. There are methods of producing artificial coruscations, or sparkling fiery meteors, which will be visible not only in the dark but in the day-time.

CORVUS, in Roman antiquity, a military engine, or rather gallery, moveable at pleasure by means of pulleys; chiefly used to cover the men in boarding the enemy's ships. An account of the construction of the corvus may be found in Polybius's History.

Corvus. Crow. In zoology, a genus of the class aves, order pices. Bill convex, sharp-edged; nostrils covered with setaceous recumbent feathers; tongue cartilaginous, bifid; feet walkers. The greater part of this tribe are found in every climate. They are prolific, social, clamorous; build in trees, and lay six eggs; their food is mixed animal and vegetable; bill with a small tooth-like process on each side near the joint; middle toe joined to the outer as far as the first joint. Forty-eight species, scattered over the globe. The following are some of the chief:

1. C. corax. Raven, of which there are the following varieties:

α. Black; back blueish black; tail roundish.

β. With a few scattered white feathers.

γ. Entirely white.

δ. Variegated with black and white.

Inhabits Europe, Siberia, North America as far as New Spain: two feet two inches long; feeds on carrion, small birds, weak lambs, dead sheep, eggs, fishes, berries, and, when pressed by hunger, dried skins and excrements; is thievish and noisy, and may be taught to speak; builds in high trees or rocks; eggs blueish green, spotted with brown, which the male sits on by day and the female by night; is long lived, and has an exquisite sense of smell. The Greenlanders eat the flesh, make the skin into garments, the wings into brushes, and the split-feathers into fishing lines.

2. C. corone. Carrion-crow. Entirely black with a violet blue gloss; tail rounded; feathers pointed at the ends. Two other varieties; one variegated with white; the other entirely white. Inhabits Europe, Siberia, North America, New Guinea, New Holland, and Madeira; eighteen inches long, feeds on carrion, and small weak animals; also on fruit and grain; very troublesome to corn lands; builds in lofty trees; the female is of a duller colour.

3. C. frugilegus. Rook. Black; front somewhat cinereous; tail roundish; colour mixed with a purplish shade; tail above with a dull green tinge. Inhabits Europe and Western Siberia: eighteen inches long; flies abroad morning and evening in great flocks, perches by night on trees in vast numbers, and builds in large communities called rookeries; is very noisy and feeds on worms, the larvæ of insects, particularly beetles, and corn: flesh when young very good.

4. C. cornix. Hooded crow. Dark ash; head, throat, wings and tail black. Inhabits Europe and Asia; twenty-two inches long; migrates in winter to more southerly parts; feeds on almost every thing, and in Sweden purges the lands of those myriads of larvæ which annually threaten to destroy their entire harvests of fruits: sits with its face towards the wind: eggs blueish green with blackish brown spots.

5. C. monedula. Jack-daw. The varieties are numerous:

α. Brown: hind-head hoary; front, wings and tail black.

β. White collar round the neck.

γ. White with a yellowish bill.

δ. Bright black: eyes surrounded with white dots.

ε. Black: bill and legs red.

ζ. Wings white: bill subcurved.

η. Bill forked.

θ. Black: hind head hoary.

ι. Brownish with white shoulders.

Inhabits Europe and Western Siberia—the variety ε Persia; feeds on insects, grain and seeds; breeds in old turrets or lofty rocks; is very gregarious, easily tamed and thievish; eggs paler, less, and not so much spotted as those of the hooded crow: thirten inches long; irids white.

6. C. glandarius. Jay. Wing-coverts blue with transverse black and white lines; body pale rusty purple, mixed with grey. Another variety white with reddish irids. Inhabits the woods of Europe and Siberia; thirteen inches long; is very docile, restless, easily tamed, and taught to speak: forms its nest of small sticks and fibrous roots; lays six eggs of the size of a pigeon's, dull olive, spotted with pale brown; collects nuts and other fruits, and hides what it cannot eat: feeds also on corn, small birds and eggs.

7. C. caryocatactes. Nut-cracker. Brown dotted with white; wings and tail black; tail feathers black at the tip, the middle ones as if worn. Inhabits Europe and Siberia: thirteen inches long; lives chiefly in pine forests; collects and feeds on insects, berries and nuts.

8. C. pica. Magpie. Four varieties:

α. Variegated black and white; tail wedged.

β. Variegated sooty black and white; eyes red.

γ. Body longitudinally streaked with black and white.

δ. Totally white.

Inhabits Europe, North America and Asia: about eighteen inches long; is crafty, restless, noisy, quarrelsome; and may be easily tamed and taught to imitate the human voice: builds in trees; covers its nest over with thorns, leaving a narrow entrance; very destructive to gardens and orchards; eggs greenish with numerous black or dusky spots.

9 C. graculus. Red-legged crow. Violet-blackish; bill and legs red. Inhabits the Alps, Norway, England, Egypt and Persia: sixteen inches long; is restless, clamorous, voracious, thievish, and gregarious; flies in a circle; builds in rocks and feeds on juniper berries and insects; is much pleased with glitter, and apt to catch up bits of lighted sticks, by which means mischief is often produced: eggs four or five, white, spotted with yellow.

Corvus, the raven, in astronomy, an old southern constellation. It consists of nine stars of the first six magnitudes, i. e. 0. 0. 2. 2. 2. 3.

CORYBANTES, in antiquity, priests of Cybele, who danced and capered to the sound of flutes and drums.

CORYBANTICA, a festival held in Crete, in memory of the Corybantes, who educated Jupiter when he was concealed in that island, from his father Saturn, who would have devoured him.

CORYCEUM. See Coriceum.

CORYCUS, whence Corycomachia, among the Greeks a kind of exercise with the hand-ball, which was suspended from a ceiling, and made to swing.

CORY'DALES. (from κορυς, a helmet.) In botany. The twenty-eighth order in Linnéus's fragments of a natural method, and the twenty-fourth of his natural orders.

CO'RYLUS. In botany. (*corylus*, derivation uncertain; according to some, from

καρυα, a walnut.) The hazel tree. In botany, a genus of the class monoecia, order polyandria. Male, ament with three-cleft scales; corolless; eight stamens. Female. Calyx bifid, variously cut; corolless; styles two; nut ovate, smooth, one-celled with the coriaceous swelling calyx. Three species:

1. C. avellana, possessing two varieties. The one the common hazel-nut, found wild in the woods of our own country, with ovate, obtuse stipules; rounded heart-like, pointed leaves; hairy branchlets. The other, the cultivated filbert with a calyx larger than the ripe nut. The fruits of both varieties are much eaten in England: they are, nevertheless, hard of digestion, and often pass the bowels very little altered; if, however, they are well chewed, they give out a nutritious oil. An oil is also obtained from the wood of this tree, which is efficacious against the tooth ach, and is said to kill worms.

2. C. rostrata. A native of North America; but met with not unfrequently in our own gardens; with lanceolate stipules; oblong, heart-like, acute leaves; glabrous branchlets; calyx of the fruit beaked.

3. C. colurna. Found wild about Constantinople, with linear, acute, stipules; roundish nuts.

CORYMB. (*corymbus.*) In botany, a head or spike of distinct flowers, whilst each flower is furnished with its proper petiole (peduncle), in an elevated proportional situation. In Lee's Introduction it is thus expressed—"Corymbus is a kind of spike, the flowers of which have each its proper pedicellus, or partial foot-stalk raised to a proportional height." In Rose's Elements it stands thus—"The corymbus, where the lesser flower-stalks of unequal lengths are produced along the common peduncle on both sides, and rise to the same height, so as to form a flat or even surface at top."—Berkenhout says, "Linnéus makes it a species of inflorescence, in which the flowers grow in clusters, each upon a separate pedunculus, as in the siliquose plants in general."—Rose's explanation is the most intelligible, but it is not Linnéus's.—There is plainly a reference to the spike for the general similitude, with two distinctions:—1. That each flower is not sessile, but on its proper pedicel. 2. That instead of the flowers being ranged along a common simple peduncle alternately, as in the spike; each pedicel is of a length proportioned to its situation, so that all the flowers form nearly a flat surface at top.—After all, the meaning of the term will be best understood by attending to the manner of flowering in the plants referred to by Linnéus. Spiræa opulifolia, ledum, and those of the siliquose or tetradynamia class. A corymb may be either simple or compound. Corymbus, in Pliny, signifies a cluster of ivy berries—"hederæ racemus in orbem circumactus." Columella puts it for the head of the artichoke.

"Hæc modo purpureo surgit glomerata corymbo."

It is a Greek word (κορυμβος), from κορυς a helmet, and that from καρα the head.

This and two other kinds of inflorescence, namely, the cyme and umbel, which bear some resemblance to each other, may be thus distinguished:

1. In the corymb, the peduncles take their rise from different heights; but the lower ones being longer, they all form nearly an even surface at top.

2. In the cyme, the peduncles take their rise from the same centre; but the subdivisions are irregular.

3. In the umbel, the peduncles take their rise from the same centre, and the whole is disposed with a striking regularity.

CORY'MBIATED. *a.* (*corymbus*, Lat.) Garnished with branches of berries.

CORYMBIFERÆ. In botany. The name of one of Ray's classes; and of the third subdivision in the order of compound flowers, in Linnéus's Natural Arrangement.

CORYMBI'FEROUS. *a.* (*corymbus* and *fero*, Latin.) Bearing fruit or berries in branches.

CORYMBIUM, in antiquity, an ornament of hair, in form of a corymbus, worn by the women.

Corymbium. In botany, a genus of the class pentandria, order monogynia. Calyx two-leaved, prismatic; corol funnel form, superior; seed solitary, invested with wool. Four species: all natives of Africa—three of them of the Cape.

CORYNOCARPUS. In botany, a genus of the class pentandria, order monogynia. Calyx five-leaved, inferior; corol five petalled; nectaries five petal-form, alternating with the petals, with a gland at the base; nut one-seeded, clavate. One species only; a native of New Zealand, with terminal, sessile panicle; alternate obovate leaves.

CORYPHA. Fan-palm. In botany, a genus of the class hexandria, order monogynia. Calyx three-leaved, corol three petalled; berry one-seeded; seed globular, large berry. Two species; natives of the East Indies and Moluccas.

1. C. umbraculifera. Umbrella-tree; with pinnate-palmate fronds, with a thread between the segments; spadix erect, the stem straight, and as tall as a ship's mast; leaves the largest of all vegetables, being able to cover twenty men; each when dry they become folded like a fan; blossoms yellow, smelling very strongly. The pith of the trunk is beaten into a kind of flower, and baked into cakes. The plums or fruit have a pleasant flavour, and are much esteemed by the natives. The leaves also serve for covering their houses, and for writing on with an iron style. Most of the books which are shown in Europe for the Egyptian papyrus are made from the leaves of this palm.

2. C. rotundifolia. This species was confounded with the preceding by Linnéus, in opposition to Rumphius himself, who thought

his saribus distinct from the coddapana of the hortus malabaricus.

CORYPHÆNA. In zoology, a genus of the class pisces, order thoracica. Head sloping suddenly downwards; gill-membrane with five rays; dorsal fin as long as the back. Nineteen species, inhabitants of the seas of Europe, Asia, and one or two species of America. The following are the chief:

1. C. hippuris. Sea-green, spotted with orange; tail forked; dorsal fin with sixty rays. Inhabits the Mediterranean; from four to five feet long; is sometimes erroneously called the dolphin; very swift, vigorous, and voracious, following ships, and greedily devouring whatever is thrown overboard. When alive in the water it has a fine golden splendour, which vanishes when it is dead; body thick, compressed, covered with thin strongly fixed scales; back blue, belly silvery; flesh tolerably good.

2. C. belifera. Silvery-ash; dorsal and anal fins very large; ventral very small. Inhabits the southern Indian ocean; body small, flat, thin, equally tapering towards the tail: covered each side with eleven rows of large thin scales, finely striate, deeply notched at the top, and armed at the base with a short recumbent spine.

3. C. psittacus. Parrot-fish. Lateral line intercepted; fins with longitudinal coloured lines. A very beautiful fish, inhabiting the coasts of Carolina—but which soon loses its colours on death. Head finely variegated; iris flame-colour, surrounded with blue: in the middle of the body towards the back a purple rhombic spot, varied with green, yellow and blue.

CORYPHÆUS, the name given by the ancient Greeks to the chief conductor of their chorus, who beat the time, &c.

In the ancient tragedy, the coryphæus spoke for all the rest, whenever the chorus took part in the action. Coryphæus is now often used for the chief of an opinion, or sect.

CORYZA. In medicine. (*coryza*, κορυζα; from καρα, the head, and ζεω, to boil). An increased discharge of mucus from the nose. See CATARRH.

CORZOLA, an island in the gulph of Venice, separated from Dalmatia by a narrow channel. Lat. 43. 16 N. Lon. 17. 0 E.

COS, in geography. See COOS.

COSCINOMANCY, the art of divination, by means of a sieve.

The word comes from κοσκινον, *cribrum*, a sieve; and μαντεια, divination.

The sieve being suspended, after rehearsing a formula of words, it is taken between two fingers only; and the names of the parties suspected, repeated: he at whose name the sieve turns, trembles or shakes, is reputed guilty of the evil in question.

This must be a very ancient practice: Theocritus, in his third Idyllion, mentions a woman very skilful in it.

COSE'CANT. *s.* (in geometry.) The secant of an arch, which is the complement of another to ninety degrees.

COSENAGE, in law, a writ that lies where the tresail, that is, the tritavus, the father of the besail, or great grandfather, being seised in fee at his death of certain lands or tenements, dies; a stranger enters, and abates; then shall this heir have this writ of cosenage; the form of which see in Fitz. Nat. Br. fol. 221.

COSENING, in law, an offence whereby any thing is done deceitfully, in or out of contracts, which cannot be fitly termed by any especial name. In the civil law it is called *stellionatus*. See STELLIONATE.

COSENZA, a town of Naples, in Italy. It is the see of an archbishop, and is defended by a strong castle. It is 105 miles S.E. of Naples. Lat. 39. 20 N. Lon. 16. 20 E.

COSH, in agriculture. See POD.

COSHE'RING, in the feudal customs, a kind of right of the lords to lie, and feast themselves, and their followers, at their tenants houses.

CO'SIER. *s.* (from *couser*, old French, to sew.) A botcher (*Shakspeare*).

CO'SINE. *s.* (in geometry.) The right sine of an arch, which is the complement of another to ninety degrees.

CO'SMEA. In botany, a genus of the class syngenesia, order polygamia frustranea. Receptacle chaffy; seeds four-sided, with a two or four-awned crown; calyx double, each of them of one eight-parted leaf. Three species—all natives of Mexico.

COSME'TIC. *a.* (κοσμητικὸς.) Having the power of improving beauty; beautifying.

COSMETICS. (*cosmetica*, κοσμητικα: from κόσμεω, to beautify.) Washes, or any applications that preserve the beauty and smoothness of the skin. See WATER.

CO'SMICAL. *a.* (κόσμος.) 1. Relating to the world. 2. An astronomical term expressing a poetical rising or setting of a star. Thus, when a fixed star rises cosmically, it rises with the sun; when it sets cosmically, it sets when the sun rises.

COSMO'GONY. *s.* (κόσμος and γόνη.) The rise or birth of the world; the creation.

COSMO'GRAPHER. *s.* (κόσμος and γράφω.) One who writes a general description of the world (*Brown*).

COSMOGRA'PHICAL. *a.* (from *cosmography*.) Relating to the general description of the world.

COSMOGRA'PHICALLY. *ad.* In a manner relating to cosmography (*Brown*).

COSMO'GRAPHY. *s.* (κόσμος and γράφω.) The science of the general system or affections of the world. It comprises astronomy and geography.

COSMO'LABE. *s.* (from κόσμος, world; and λαμβανω, I take.) An ancient instrument serving to measure distances, both celestial and terrestrial.

COSMOLOGY. (from κοσμος, world; and λογος, discourse.) The science of the world in general: This Wolfius calls general, or trans-

cendental cosmology, and has written a treatise on the subject, wherein he endeavours to explain how the world arises from simple substances.

COSMOPOLITAN. Cosmopolite. *s.* (κόσμος and πολίτης.) A citizen of the world; one who is at home in every place.

COSS, a measure of length used in Hindustan, of which about 40 go to a degree on the meridian.

Coss (Rule of), in mathematics. See the history of Algebra.

COSSACKS, a people inhabiting the confines of Poland, Russia, Tartary, and Turkey. They are divided into Kosakki-sa-Parovi, the Kosakki-Donski, and the Uralian Cossacks. These people are large and well made, have blue eyes, brown hair, and aquiline noses; the women are handsome, well shaped, and complaisant to strangers. The Uralian Cossacks dwell in villages, along the banks of the Ural, and their chief town is Uralsk. They profess the Greek religion; but there is a kind of dissenters from the established religion, whom the Russians called Roskolniki, or Separatists, and who style themselves Staroverski, or Old Believers. They consider the service of the established church as profane and sacrilegious, and have their own priests and ceremonies. The Uralian Cossacks are all enthusiastics for the ancient ritual, and prize their beards almost equal to their lives. The country which the Kosakki-sa-Parovi inhabit is called the Ukraine, and their towns are built of wood, after the manner of the Russians. The Kosakki-Donski dwell on both sides of the Don; are under the protection of Russia, and profess the same religion.

COSSART LAMB, or Cosset, in rural economy, a lamb which, having lost its dam, is brought up by hand.

COSSIGENA. In botany, a genus of the class hexandria, order monogynia. Calyx inferior, five parted; corol four or five petalled; capsule three-celled, opening at top; the cells about three-seeded. Two species—natives of the isle of Bourbon and the Mauritius.

COSSUS. A tribe of the genus phalæna of lepidopterous insects. See Phalæna.

COSSYPHUS, in the Fabrician system of entomology, a tribe of the coleopterous genus lampyris. See Lampyris.

COST. *s.* (*kost*, Dutch.) 1. The price of any thing. 2. Sumptuousness; luxury (*Waller*). 3. Charge; expence (*Crashaw*). 4. Loss; fine; detriment (*Knolles*).

To Cost. *v. n.* (*couster*, French.) To be bought for; to be had at a price (*Dryden*).

COSTA. (*costa, a custodiendo*; because the ribs surround and defend the vital parts.) A rib. The ribs are four-and-twenty in number, twelve on each side of the thorax.

Costa Rica, a province of New Spain, bounded on the N.E. by the gulf of Mexico, on the S.W. by the Pacific ocean, on the N.W. by Nicaragua, and on the SSE. by Veragua. New Carthage is the capital.

CO'STAL. *a.* (*costa*, Latin, a rib.) Belonging to the ribs (*Brown*).

CO'STARD. *s.* (from *coster*, a head.) 1. A head (*Shakspeare*). 2. An apple round and bulky like the head (*Burton*).

COSTATE LEAF. In botany. (*folium costatum.*) A ribbed-leaf as in echites siphilitica.

COSTE (Peter), a learned French protestant, who translated into French, Locke on the Human Understanding, on the Reasonableness of Christianity, and Newton's Optics. He also wrote the Life of the great Condé, and other works. He died at Paris in 1747.

CO'STIVE. *a.* (*costipé*, French.) 1. Bound in the body; having the excretions obstructed (*Prior*). 2. Close; impermeable (*Mortimer*).

CO'STIVENESS. *s.* The state of the body in which excretion is obstructed. See Constipation.

In many families, costiveness is hereditary. It may also arise from a debilitated state of the intestinal canal, occasioned by diseases, but more frequently from the habitual use of lean meat, game, red-port wine, strong malt liquors, and similar articles of food and drink. From whatever cause it may originate, continual exercise in the open air, and abstinence from heating or intoxicating liquors, will be found very beneficial.

In those cases, however, where inveterate costiveness has once taken place, and the usual simple remedies have proved abortive, carbon, or charcoal (divested of its oxygen by heat), has been administered with uncommon success. Nor has it in any instance failed to procure the desired relief; though its operation has sometimes been rather too violent: to obviate this inconvenience, we would recommend three drams of carbon finely levigated, to be mixed with three ounces of lenitive electuary, and two drams of carbonat of soda. Of this mixture, from half an ounce to one, and even two ounces, may be taken twice, thrice, or oftener, in the course of the day, as circumstances may require.

CO'STLINESS. *s.* (from *costly*.) Sumptuousness; expensiveness (*Glanville*).

CO'STLY. *a.* (from *cost*.) Sumptuous; expensive; of a high price (*Dryden*).

COSTMARY, in botany. See Tanacetum.

CO'STREL. *s.* A bottle.

COSTUME, a rule or precept in painting, by which the artist is enjoined to make every person and thing sustain its proper character, and not only observe the story, but the circumstances, the scene of action, the country or place, and take care that the habits, arms, manners, proportions, and the like, exactly correspond.

Commonly the term is restricted to the garments, robes, &c. of a people: thus, the several peculiarities in the dresses of doctors, masters of arts, bachelors, undergraduates, &c. constitute what is usually called the costume of a university. Those antiquaries who have treated of the ancient Irish costume should have consulted the old French satirist, the sieur d'Auvray, in whose work, entitled the

Banquet des Muses, ou Recueil de toutes les Satyres, Yambes, Macarades, &c. (Rouen. duod. 1623), among many other curious passages, are the following allusions to the mantles of the true or aboriginal Hibernians:

"Il jugeoit à l'œil et au pas
Les filles d'amoreux appas,
Comme les Laquais aux mandilles,
Aux mantes les vrays Irelandois,
Aux chapeaux longs les Albanois,
Et les Espagnols aux roupilles."—p. 324.

"Un chapelet pour avoir bonne grace,
Un pelisson, un capot d'Ilandois," &c.—p. 336.

On the subject of our old English dresses, one of the most curious passages we recollect is to be found in a work where few readers would expect it—Fuller's Pisgah-Sight of Palestine: folio, 1662; book iv. ch. 6. Speaking of the various habits and ornaments of the Jews, he notices the changes they underwent, and in a digression, says, "For instance, it would pose a good antiquary to describe the exact fashion of harlots, gits, haketons, paltocks, tabards, court-pies, chevesailes, and gipsers: barbarous names, which may seem to carry a spell or conjuration in the mention of them. Yet all these were kinds of garments commonly used in England, some four hundred years ago. Yea, pride, playing in all ages upon conceited opinions of decency, hath infinitely varied the fashion of all apparel; custome of our ancestors appearing antick to us, as our fashion (perchance) will seem incredible to posterity. Who would believe that ever our English, some four hundred yeares since, wore shooes snouted and picked more than a finger long, crooking upwards (called crackowes), resembling the devil's clawes, which were fastened to the knees with chains of gold and silver? Or, that about the reign of king Henry the Fifth, men grew so excessive in that kind, that it was fain to be ordered by proclamation, that none should wear their shooes broader at the toes than six inches?"

Some entertaining particulars on this subject may be read in Malcolm's Anecdotes of the Eighteenth Century, pp. 427—432.

COSTUS. In botany, a genus of the class and order monandria, monogynia. Calyx three-cleft, gibbous; corol three-parted, ringent: nectary two-lipped, the lower very large, and three-lobed. Three species:

1. C. Arabicus. Arabian costus, but also common to India. Leaves glabrous on each side; spike few-flowered, the scales foliaceous at the tip, the topmost fastigiate. The root of this tree possesses bitter and aromatic virtues, and is considered as a good stomachic. In many dispensatories it is given under the name of costus dulcis.

2. C. spicatus. Also a native of India; distinguished from c. Arabicus by having its spike many-flowered, sub-ovate, imbricate, with ovate, simple scales.

3. C. speciosus. Also an Indian plant, and deriving its specific name from its beauty. Its leaves are silky beneath; petals flesh-colour.

COT, COTE, COAT. At the end of the names of places, from the Saxon cot, a cottage (*Gibson*).

COT. *s.* (cot, Saxon.) A small house; a cottage; a hut; a mean habitation (*Fenton*).

COT. *s.* An abridgment of *cotquean*.

COTA'NGENT. *s.* (In geometry.) The tangent of an arch, which is the complement of another to ninety degrees, or to a quadrant.

COTBUS, a strong town of Germany, in Lower Lusatia, subject to the king of Prussia. Lat. 51. 36 N. Lon. 14. 12 E.

To COTE. *v. a.* To leave behind (*Chapman*).

COTE D'OR, a department of France, containing part of the late province of Burgundy. Dijon is the capital.

COTES DU NORD (North coasts, Department of), one of the new divisions of France, bounded on the north by the English channel, on the east by the department of the Ille and Villaine, on the south by that of Morbihan, and on the west by that of Finisterre and the sea, forming a part of what was before called Bretagne: about sixty-five miles from east to west, from twenty-seven to forty-five from north to south. St. Brieuc is the capital.

COTELERIUS (John Baptist), a learned Frenchman, and professor of Greek at Paris. He was born at Nismes in 1627, and was honoured with the degree of MA. at the age of 16, in consideration of his uncommon talents. In 1649 he became a member of the Sorbonne. He applied himself chiefly to the Greek fathers, and published the works of those who lived in the apostolic age, in 2 vols. folio, 1672. In 1675 appeared the first volume of a Greek work, entitled, Monumenta Ecclesiæ Gracæ; but he did not live to finish it, being carried off by an inflammatory disease in 1686.

COTE'MPORARY. *a.* (*con* and *tempus*, Lat.) Living at the same time; coetaneous (*Locke.*)

COTERELLUS, in ancient customs, a servile tenant, who held in mere villenage; and whose person, issue, and goods were at the lord's disposal.

COTERIE, a term adopted from the French trading associations or partnerships, where each person advances his quota of stock, and receives his proportion of gain. It is now used to signify a club of ladies.

COTES (Roger), an eminent English mathematician, born in 1682, at Burbach in Leicestershire. After receiving an excellent preparatory education he was removed to Trinity college, Cambridge; of which society he was chosen fellow. He was at the same time tutor to the sons of the marquis of Kent, to which family he was allied. The next year he was chosen Plumian professor of astronomy and experimental philosophy, and the same year took his degree of M.A. In 1713 he was ordained, and published a new edition of sir Isaac Newton's Principia, with a learned pre-

face. He died in 1716, and was buried in the chapel of Trinity college. Mr. Cotes left behind him some very ingenious, and indeed admirable tracts, part of which, with the Logometria, were published, in 1722, by Dr. Robert Smith, his cousin and successor in his professorship, afterward master of Trinity college, under the title of Harmonia Mensurarum, which contains a number of very ingenious and learned works. He wrote also a Compendium of Arithmetic; of the Resolution of Equations; of Dioptrics; and of the Nature of Curves. Besides these pieces, he drew up, in the time of his lectures, a course of Hydrostatical and Pneumatical Lectures, in English, which were published also by Dr. Smith, in 8vo. 1737, and are held in great estimation.

So high an opinion had sir Isaac Newton of our author's genius, that he used to say, "If Cotes had lived, we had known something."

Mr. Cotes's preface to the Principia has, deservedly, obtained him much celebrity: it is written with great eloquence and force, and in the main ably refutes the objections of the Cartesians and other philosophers against the Newtonian philosophy. But it has been too hastily concluded, particularly on the continent, that this preface was composed under Newton's inspection, and received his entire approbation: this was not the case: Newton himself informs us in the preface to Comm. Epistol. "Quæ novæ Principiorum editioni præmissa sunt, Newtonus non vidit antequam liber in lucem prodiit;" and it is pretty certain that he was far from satisfied with many parts of this preface, and that he once intended publishing another edition of his work without it: but the death of Mr. Cotes induced him to change his intention; he suffered the preface to be published with the 3d edition of the Principia, out of respect to the memory of his deceased friend; and, that no opinion might be attributed to himself, on this account, which he never held, he excellently explains his own views and method of philosophising in the Phil. Trans. No. 342.

COTESIAN THEOREM, in the higher geometry, an appellation distinguishing an elegant property of the circle discovered by Mr. Cotes, and of great use in the integration of differentials by rational fractions. The theorem is this:

If the factors of the binomial $a^n \underset{\backsim}{+} x^n$ be required, the index n being an integer number. With the centre O and radius $AO = a$ (fig. 1, 2. pl. 50.) describe a circle and divide its circumference into as many equal parts as there are units in $2n$, at the points A, B, C, D, &c. then in the radius, produced if necessary, take $OP = x$, and from the point P, to all the points of division in the circumference, draw the lines PA, PB, PC, &c. so shall these lines taken alternately be the factors sought; viz.

$PB \times PD \times PF$, &c. $= a^n + x^n$,

and $PA \times PC \times PE$, &c. $= a^n \backsim x^n$, viz. $a^n - x^n$ or $x^n - a^n$, according as the point P is within or without the circle.

For instance, if $n = 5$, divide the circumference into 10 equal parts, and the point P being within the circle, then

will $OA^5 + OP^5 = BP \times DP \times FP \times HP \times KP$,

and $OA^5 - OP^5 = AP \times CP \times EP \times GP \times IP$.

In like manner, if $n = 6$, having divided the circumference into 12 equal parts, then will

$OA^6 + OP^6 = BP \times DP \times FP \times HP \times KP \times MP$,

$OA^6 - OP^6 = AP \times CP \times EP \times GP \times IP \times LP$.

Or, to be a little more particular, in the case where $n = 5$: here supposing $OA = a$, and $OP = x$, since the circle is divided into ten equal parts, we shall know the sines and cosines of each of the arcs, as AB, AC, AD, &c. and shall obtain the expressions of PA, PB, PC, &c. or PB^2, PC^2, PD^2, &c. We have, in this individual example $PA = a - x$, which is the first divisor sought of $a^5 - x^5$. The arc AC being 72^0, its sine Cc is given as well as its cosine Oc, and consequently Pc will be $x - \cos. 72^0$. Therefore $PC^2 = Cc^2 + x^2 - 2x \cos. 72° + \cos.^2 72°$. But the squares of any sine and its corresponding cosine are together equal to the square of the radius; so that the expression becomes transformed into this, $PC^2 = a^2 - 2x \cos. 72^0 + x^2$. In like manner, we shall have $PE^2 = a^2 + 2x \cos. 144° + x^2$; but $\cos 144° = -\cos. 36°$, which will give $PE^2 = a^2 - 2x \cos. 36° + x^2$. The three factors of $a^5 - x^5$ are, therefore, $a - x$, $a^2 - 2x \cos. 72° + x^2$, and $a^2 - 2x \cos. 36° + x^2$. Of these the two latter are manifestly quadratic; but they cannot be subdivided into any other than imaginary simple factors: for, on resolving this equation $x^2 - 2x \cos. \ldots + a^2$, we shall find it to become finally, $x - \cos. \ldots = \surd(\cos.^2 \ldots - a^2)$; which is always an imaginary expression whatever be the arc whose cosine enters it, because the cosine is always less than a the radius. From this example our readers will see the method of applying the theorem to other cases

This theorem may be deduced from Vieta's theory of angular sections, in which we have, as is well known,

$$\text{when, } \left.\begin{aligned} \cos. 1x &= p \\ \cos. 2x &= 2p^2 - 1 \\ \cos. 3x &= 4p^3 - 3p \\ \cos. 4x &= 8p^4 - 8p^2 + 1 \\ \cos. 5x &= 16p^5 - 20p^3 + 5p \end{aligned}\right\}$$

Or generally,

$$2 \cos. mx = (2p)^m - m\,(2p)^{m-2} + \frac{m(m-3)}{2}(2p)^{m-4} - \frac{m\,(m-4)\,(m-5)}{2\,.\,3}(2p)^{m-6} + \&c.$$

For, multiplying these formulæ by 2, and supposing $p = y + \frac{1}{y}$, they will reduce to this simple form:

$$2 \cos. 1x = y + \frac{1}{y}.$$

$$2 \cos. 2x = y^2 + \frac{1}{y^2}$$

$$2 \cos. 3x = y^3 + \frac{1}{y^3}$$

Or, generally, $2 \cos. mx = y_m + \frac{1}{y^m}$

A theorem which is equivalent to Cotes's, and is at the same time a branch of a more universal theorem given by Demoivre in the Phil. Trans. for 1722. The reader may farther consult, on the subject of the Cotesian theorem, and its applications, Dr. Pemberton's Epist. de Cotesii inventis, Dr. Smith's Theoremata Logometrica and Trigonometrica, added to Cotes's Harm. Mens. pa. 114; Demoivre Miscel. Analyt. pa. 17; Waring's Letter to Dr. Powell, pa. 39; Simpson's Essays, pa. 113; and Lagrange, Leçons sur le calcul des Fonctions, pa. 143.

COTESWOLD, a hilly plain, with several sheep-cotes, and sheep feeding. It comes from the Saxon *cote*, a cottage; and *wold*, a place where there is no wood. It is generally applied, by us, to a long tract of high ground in the east part of Gloucestershire.

COTHURNUS, Buskin, a very high shoe or patten raised on soles of cork, worn by the ancient actors in tragedy to make them appear taller and more like the heroes they represented.

COTICULA, in the natural history of the ancients, the word by which the Romans expressed the *ακονη* of the Greeks; a stone of very great hardness, brought from Armenia, and used on many occasions; one of which was the working on such of the harder stones as iron instruments would not touch.

COTILLON, a lively, brisk dance, generally written in the time of $\frac{6}{8}$. The term originally signifies an *under petticoat*.

COTLAND. *s.* (*cot* and *land.*) Land appendant to a cottage.

CO'TQUEAN. *s.* (probably from *coquin*, French.) A man who busies himself with women's affairs (*Addison*).

COTT, in naval affairs, a particular sort of bed-frame, suspended from the beams of a ship for the officers to sleep in. It is made of canvas, sewed in the form of a chest, about six feet long, one foot deep, and two or three wide, and is extended by a square wooden frame with a canvas bottom, on which the bed or mattrass is laid. It is reckoned much more convenient at sea than either the hammocks or fixed cabins. The name is now often given to swing cradles for children.

CO'TTAGE. *s.* (from *cot.*) A hut; a mean habitation; a little house (*Pope*).

COTTAGE, in law, a little house for habitation, without lands belonging to it, stat. 4 Edw. I. But by a later statute, 31 Eliz. c. 7. no man may build a cottage unless he lays four acres of land to it, except in cities or market-towns, or within a mile of the sea, or for the habitation of miners, sailors, foresters, shepherds, &c.; excepting also cottages erected by justices of the peace for poor impotent persons. The above four acres of land must be freehold, and land of inheritance; copyhold, or lease for years, are not sufficient tenure by the statute.

CO'TTAGER. *s.* (from *cottage.*) 1. One who lives in a hut or cottage (*Swift*). 2. One who lives on the common, without paying rent (*Bacon*).

CO'TTIER. *s.* (from *cot.*) One who inhabits a cot.

CO'TTON. *s.* (*cottone*, Ital. *cotton*, Fr.) 1. The down of the cotton tree (*Wiseman*). 2. Cloth made of cotton.

COTTON, in botany. See GOSSYPIUM.

COTTON LAVENDER. See SANTOLINA.

COTTON-TREE SILK. See BOMBAX.

COTTON GRASS. See ERIOPHORUM.

COTTON THISTLE. See ONOPORDUM.

COTTON WEED. See FILAGO.

To CO'TTON. *v. n.* 1. To rise with a nap. 2. To cement; to unite with (*Swift*).

COTTON, in commerce, is the produce of the gossypium herbaceum, a plant about the size of a currant bush, a native of the torrid-zone, though it is produced in parts of Turkey, as far as 45° of north latitude.

Cotton is separated from the seeds of the plant by a mill, and then spun and prepared for all sorts of fine work, as stockings, waistcoats, quilts, &c. Calico and muslin are likewise made of cotton, and sometimes it is mixed with wool, sometimes with silk, and even with gold itself. The finest sort comes from Bengal and the coast of Coromandel. Cotton makes a very considerable article in commerce, and is distinguished into cotton-wool and cotton-thread. The first is brought mostly from the West India islands, and Smyrna: the most esteemed is white, long, and soft. Those who buy it in bales should see that it has not been wet, moisture being very prejudicial to it.

Of cotton-thread, that of Damas, called cotton-d'ounce, and that of Jerusalem, called bazas, have been the most esteemed; as also that of the West Indian islands. But with the help of the machines now in general use in Britain, we are able to spin it of almost any degree of fineness. Cotton of Siam is a kind of silky cotton in the Antilles, so called because the grain was brought from Siam. It is of an extraordinary fineness, even supassing silk in softness. They make hose of it there, preferable to silk for their lustre and beauty; They sell at from 10 to 12 and 15 crowns a pair, but there are very few made unless for curiosity.

The generality of cotton is white; but some is of a nankeen colour, and is invaluable in the manufacture of that article, as it fades very little, even with long use and frequent washing. The elasticity of cotton is inconceivable! It may be pressed into a 50th part of the space into which the strongest packers can reduce it by personal exertion: large screws are erected at many sea-ports where cotton is shipped, for the purpose of bringing the bales into the smallest compass, so as to save freight. Cotton can only be imported as a raw material, in which form it comes to us from the Levant, the West Indies, South America, and the East Indies.

The spinning of cotton, or the process of

converting cotton-wool into yarn or thread, has been variously performed. The most simple method for this purpose, and the only one in use for a long time in this country, was by the hand, upon the well-known domestic machine called a one-thread wheel. But as the demand for cotton goods began to increase, other inventions were thought of for expediting this part of the manufacture. About 60 years ago, one Paul, and others, of London, contrived an engine for a more easy and expeditious method of spinning cotton, and for which they obtained a patent; but the undertaking did not prove successful. Some years after, various machines were constructed by different persons for facilitating the spinning of cotton, but without producing any very material or lasting advantage. At length, about the year 1767, Mr. James Hargrave, a weaver in the neighbourhood of Blackburn, in Lancashire, constructed a machine by which a great number of threads (from 20 to 80) might be spun at once, and for which he obtained his majesty's letters-patent. This machine is called a jenny, and is the best contrivance for spinning woof or shoot that has hitherto appeared. It is now commonly constructed for 84 threads; and with it one person can spin 100 English hanks in the day, each hank containing 840 yards.

Cotton (Carding of), as a preparation for spinning, used formerly to be performed by the hand, with a single pair of cards, upon the knee: but this being a tedious method, ill-suited to the rapid operations of the new spinning-machines, other methods were contrived for affording a quicker and more adequate supply. The first improvement for this purpose was likewise made by Mr. Hargrave; and consisted in applying two or three cards to the same board, and fixing them to a stool or stock; whence they obtained the name of stock-cards. With these, one woman could perform two or three times as much work as she could do before in the common way. A still more expeditious method of carding, however, by what are commonly called cylinder cards, was soon afterwards invented, and is that which is now most commonly practised: but as several persons lay claim to this invention, it is not easy to determine to whom in particular the merit of it is due.

The next and most capital improvements which this branch of manufacture received were from Mr. Arkwright, a native of Lancashire, afterwards sir Richard Arkwright, of Cromford, in Derbyshire. He first brought forward his new method of spinning cotton in 1768, for which he obtained a patent in 1769: he afterwards, in 1775, obtained a patent for engines which he had constructed to prepare the materials for spinning; though one of these patents, being challenged at law, was set aside some years before it expired. The result of Mr. Arkwright's different inventions and improvements is a combination of machinery, by which cotton is carded, roved, and spun, with the utmost exactness and equality; and such a degree of perfection attained in spinning warp, as is not to be equalled in any other part of the world. To these improvements this country is entirely indebted for the great extent of its cotton-manufactures; large buildings having been erected for that branch both in England and Scotland, many of which contain several thousands of spindles, each driven by one or more large water-wheels; and some of such extent as to spin at the rate of one thousand yards of twist or warp-yarn in a minute.

Other machines have been invented at different times, and a variety of improvements made by different mechanics and manufacturers; one of which in particular we must not omit to mention. It is called a mule, being a kind of mixture of machinery between the warp-machine of Mr. Arkwright and the woof-machine or hand-jenny of Mr. Hargrave; and was also invented in Lancashire. This machine promises to be of great use in spinning cotton-yarn for muslins to a degree of fineness never before known in this country, being nearly equal in quality to those usually brought from India.

Cotton-mills, are large buildings with peculiar machinery for carding, roving, and spinning cotton: see the preceding article. These were entirely unknown in this country before the different inventions and improvements of Messrs. Arkwright and Hargrave; since which time great numbers have been erected in England, and several in Scotland. The first erections of the kind were by Messrs. Arkwright and Hargrave, both in the town of Nottingham, and both nearly at the same time. The engines were then driven by horses: but since that time they have been chiefly erected upon water-falls in different parts of the country; particularly the warp machines, which are better adapted for being driven by water than any other. The most extensive of these is in the village and neighbourhood of Cromford, in Derbyshire, and under the immediate inspection of sir Richard Arkwright. The first that was erected in Scotland was for Mr. Peter Brotherston, under the inspection and direction of Mr. John Hackett, from Nottingham; and is in the neighbourhood of Pennycuick, near Edinburgh. Since which time several have been erected in the neighbourhood of Glasgow, Paisley, Lanerk, Perth, &c.

The cotton-mills at New Lanerk, in the county of Lanerk, in Scotland, are situate on a beautiful and romantic amphitheatre, near the high road between Carlisle and Glasgow. The rapid stream of the Clyde supplies that abundance of water, which is the powerful operator of the machinery. For the purpose of conveying and directing its power, a subterraneous aqueduct is cut for many hundred yards through the solid rock. The first mill, in length 154 feet, was originally erected in 1785; and, having been burnt down, was rebuilt in 1789. The second is exactly of the same dimensions; the third is 130 feet; and the fourth 156 feet, in length.

The two first mills contain 12,000 spindles for spinning water twist; the other two are occupied by jennies, for spinning mule yarn. The village of New Lanerk owes its existence to the erection of these mills. It consists of neat substantial houses; forming two streets about half a mile in length, and broad, regular, and clean. Near the centre of the village are the mills; and opposite to them a neat mansion, the occasional residence of Mr. Dale, the proprietor, and of his principal manager. The village, consisting chiefly of Highlanders from the counties of Argyle, Caithness, and Inverness, contains about 1,500 inhabitants; of whom all who are capable of work are employed in and about the mills. Of these, there are 500 children who are entirely fed, clothed, and educated by Mr. Dale. The others lodge with their parents in the village, and have a weekly allowance for their work. A very interesting and pleasing account of the management of these mills has been published in the Reports of the Society in London for bettering the condition of the poor.

Having given these particulars relative to the manufactory of cotton, we will now present the reader with a general sketch of the mode of procedure with regard to this important article of commerce, pursued by the Lancashire manufacturers.

Cotton comes to us without any farther preparation than having been tolerably carefully picked out of the pod in which it grows; but still much dirt, husk, and other impurities, remain in it. This is first separated by women, who beat the cotton with sticks upon hurdles, and pick out the more gross impurities with their fingers. It is then taken to the carding engine, where it is first scribbled, as the wool-carder would say, and afterwards, by a contrivance of much ingenuity, divided into perpetual cardings, which are caught by, and coiled round the sides of long tin cylinders. These coils are taken to the mules, first to be roved, which answers to slubbing, and afterwards to be spun into threads of any requisite fineness. The invention of the mules forms quite an epoch in the history of the cotton trade. A vast improvement had been made, about forty years ago, by the introduction of the spinning jennies, by which from twenty to forty spindles were turned at a time. Still, however, the rovings, or coarse half-twisted threads, partaking somewhat of the nature of cardings, though approaching in some degree to spun twist, were obliged to be prepared by the hand-wheel. The invention of mules entirely supplied this defect; and, while it enabled the spinner to prepare her rovings as fast as she before could spin, at the same time it put her in a way of performing her farther work much more expeditiously and completely. The machine is called a mule, because it is a sort of mongrel, partaking of the nature both of carding and spinning, or uniting together the action both of the roller and spindle. It consists of three sets of fluted brass rollers, the flutes of which turn into each other: the first set goes faster than the second, and the second faster than the third, between which, when the roll of carded cotton enters, it is a little lengthened out, still more by the second, and farther still by the first, after passing which, it is slightly twisted by the rapid circular motion on its axis, communicated by a leather band to a perpendicular tin cylinder, into which it falls. If the roving be not made thin enough by the first operation, it is made to undergo a repetition of it, and it is then carried to the spinning mules; which differ from the former only in this, that when the threads have passed the rollers, they are drawn out and twisted by a course of spindles, which are set in motion after a sufficient quantity of the roving has passed the rollers, which are themselves, at this time, stopped. The advantage of this mode of preparing the threads we understand to be, that the fibres of the cotton are all laid longitudinally, and in as small a number as is wanted, before they are begun to be much twisted, by which means, threads of any required fineness are made much stronger than they were from rovings prepared upon the spindle, which twisted them too much in the first instance; and in the subsequent processes for rendering them finer, many of the fibres were necessarily broken. On one of these mules 240 threads are often spun at once, and two of them may be managed by one woman, with a child to each, to tie the threads which may occasionally break. A large factory for these operations usually consists of a vast cellar to hold the raw material, of a ground floor for the pickers and beaters; and in the upper floors, first teazing and carding engines, then roving machines, afterwards mules, and lastly, machines for winding the thread or twist: the whole occupying a building of six or seven stories, and all moved, either by a large water-wheel, or by a small steam-engine, which if of Boulton and Watt's construction, occasions very little inconvenience to the neighbourhood, as it consumes nearly all its smoke. For winding the thread regularly off the spindles upon bobbins, various contrivances are in use: none, however, appears more simple than a heart-shaped axis, which moves the bobbin to the right or left, according to the position of the apex or the base of the heart. Other portions of the thread are wound in quills for the shuttle; and others, again, are formed into hanks, some of which are tightly bound at certain intervals, previous to their being dyed, in order to prevent the parts so tied from taking the colour. This is done, that the threads may be disposed in the warp, so as to produce the clouds which are seen in various species of the cotton goods, particularly ginghams. The only colours which the cotton manufacturer has hitherto been able to render so permanent as to withstand the effect of bleaching are, the Turkey red, the dark-blue, and the buff. A durable green would certainly make the fortune of any chemist who should discover it.

The warp being fixed in the loom, or, in the language of the country, gaited, is divided to give passage to the weft in the shuttle, either by two, three, or more treadles; or, if the pattern, or course of changes in the order of raising and depressing the threads of the warp, be various, so that the weaver could not manage the requisite number of treadles, by a great number of strings which pass over pulleys above the loom, and are drawn, one after another, by a little boy, above whose head they are orderly disposed in two rows, by the side of the looms. These looms are therefore called drawboys. These boys, however, will shortly be set aside for machinery, which is rapidly introducing as a substitute.—For the formation of sprigs, &c. of various colours, there are often as many shuttles as colours; or a number of little swivel-looms, such as they use for the weaving of tapes, are introduced occasionally, as many as there are sprigs in the breadth of the piece. Quiltings appear to be two distinct cloths, tied, as it were, together, by stitches which go through both cloths; and in some cases, as in bed-quilts, there is a third shuttle, which throws in a quantity of coarsely spun cotton, to serve as a kind of wadding.—The counterpanes are woven with two shuttles, one containing a much coarser weft than the other; the coarser weft is thrown over at certain intervals, and the thread is picked up with an iron pin, rather hooked at the point, so as to form knobs disposed in a sort of pattern.

When the goods are come from the loom, most of the sorts of them, previously to their being bleached, are dressed or fired, by being drawn, and that not very quickly, over very red-hot cylinders of iron, by which the superfluous nap is burnt off. To see such an operation performed upon so combustible a substance, naturally fills a stranger with the utmost astonishment. They are then washed in a wheel with soap and water, and, having been well scoured with an alkaline lixivium, are dipped in the oxygenated muriatic acid diluted to its proper strength. These operations are repeated alternately, till the goods have attained the requisite degree of whiteness; and between each dipping, they are laid out upon the ground, exposed to the action of the sun and air. When completely bleached, they are either smoothed upon long tables, with smoothing-irons, or calendered, that is, stretched and pressed between a course of rollers, by which they acquire a fine gloss. Calicoes are printed exactly in the same way as the kersymeres in Yorkshire; but the works are usually upon a much larger scale.—Thicksets, corduroys, velveteens, &c. are cut upon long tables, with a knife, of a construction somewhat like the sting of a wasp, terminating in a very sharp point, defended on each side by a sort of sheath. This point is introduced under the upper course of threads, which are intended to be cut, and with great ease carried forward the whole length of the table.

The manner of manufacturing cotton in India forms a remarkable contrast to the European method. In Europe, a vast apparatus of machinery is used in every part of the process, while in India the simplest instruments are made to produce fabrics of that exquisite fineness, which it is the boast of our manufacturers to imitate, and which as yet they can scarcely equal. The cotton wool in India is prepared for the spinner without cards, is spun for the weaver without wheels, and is woven in looms without any frame-work, which the weaver can move from one place to another with as much facility as the web itself.

The operation which our manufacturers perform by carding engines, is executed by the Indian with nothing more than a bow; the percussions of whose string snapped over the cotton wool in repeated vibrations, raises it to a fine downy fleece; in this same way our hatters prepare their furs for felting; an operation which may be seen in most towns.

The fine thread, or yarn, from which the choicest muslins are made, are spun from cotton thus prepared by the distaff and spindle, a mode which it is evident was practised by the Romans, Greeks, and Egyptians, from their history, their fables, and their sculptures, and than which nothing can be more simple; this yarn is then wove on the loom. See INDIAN LOOM.

For a valuable account of the manufactures carried on at Bangalore, and the processes used for dying silk and cotton, which, we regret, is too long to be inserted here, we refer to Buchanan's Journey through the Mysore, &c. or Nos. 119, 120, of Tilloch's Philosophical Magazine.

The following will show the progressive increase of the importation of cotton into Great Britain since the year 1780:—

In the year	1781 imported	5,101,920 lbs.
	1782	11,206,810
	1783	9,546,179
	1784	11,280,238
	1785	17,992,888
	1786	19,151,867
	1787	22,600,000
From 1786 to 1790	average	23,443,670 per ann.
In the year	1799	46,000,000
	1800	56,010,732
	1802	65,850,395
	1806	75,000,000

The cotton imported for the manufacture of 1787 was of the following growth:—

British West Indias, about	6,600,000 lbs.
French and Spanish settlements	6,000,000
Dutch settlements	1,700,000
Portuguese ditto	2,500,000
East Indies, *via* Ostend	100,000
Smyrna and Turkey	5,700,000
	22,600,000

The application of this cotton to the different branches of manufacture was supposed, according to the statement of Dr. Rees, to be—

Candlewicks	1,500,000 lbs.
Hosiery	1,500,000
Silk and linen mixtures	2,000,000
Fustians, &c.	6,000,000
Calicoes and muslins	11,600,000
	22,600,000

In the branches applicable to muslin and calico alone, it was calculated that employment was given in England and Scotland to 100,000 men and women, and at least 60,000 children. From the latest accounts, it appears that the cotton manufacture of these realms gives employment to 800,000 persons, and that its annual value is upwards of 30 millions of pounds sterling.

London and Liverpool are the great marts for cotton, and of these London was long the principal; but the situation of Liverpool, in the centre of the cotton manufactures of the north, has rendered it the principal market in the kingdom: and indeed great part of the cotton belonging to the merchants in London is now consigned there.

Cotton paper. See Paper.

COTTONIAN LIBRARY, consisting of curious manuscripts, &c. was founded by sir Robert Cotton, who was forty years in collecting it; and at his death, in 1631, left the property of it to his family, though designed for public use. A large accession was made to this library by private benefactions before the death of the founder, and afterwards by the purchases of his heirs, and donations of others, who added to it a great number of books, chiefly relating to the history and antiquities of our own nation. An act of parliament was obtained, at the request of sir John Cotton, in 1700, for preserving it after his decease, under the above denomination, for public use. It is now fixed in the British Museum. For statutes relating to it, see 12 and 13 W. III. c. 5. and 5 Anne, cap. 30.

COTTUS. Bullhead. In zoology, a genus of the class pisces, order thoracica; head broader than the body, spinous; eyes vertical, furnished with a nictitant membrane: gill membrane six rayed: body round, without scales; tapering towards the tail: dorsal fins or more. Ten species, chiefly inhabitants of the European or Indian seas. The following are the chief. See Nat. Hist. Plate I.

1. C. cataphractus. Armed bullhead. Pogga. Body octangular, mailed; upper jaw with two upright bifid spines; throat with numerous cirri: head large, bony, ragged; eyes lateral, round, pupil black, iris yellow; mouth beneath lunate; upper jaw longer; teeth numerous, small, both in the jaws and palate; tongue broad, thin; aperture of the gills large, the covers of one piece; body covered with strong bony crusts, divided into series, the ends of which project into a sharp point, forming prickly lines down the sides and back; back with three or four black spots, lateral line in the middle of the body straight; vent nearer the head; dorsal fins two, the rays of the first spinous, of the second soft, both cinereous with square black spots; pectoral fins roundish, hoary, large, spotted with black; ventral fins narrow, long; anal fins black at the base; dorsal rounded, the rays branched. Inhabits the European coast; six inches long; feeds on small crabs and other aquatic meats; body brown; beneath white.

2 C. quadricornis. Four horned bullhead. Four bony protuberances in the middle of the head. Inhabits the Baltic and Greenland seas: ascends rivers, and feeds on worms and insects; is a bold, voracious fish; body dusky clouded with brown; beneath dirty yellow; pectoral fins very large, which it is perpetually agitating.

3. C. scorpius. Father lasher. Head armed with numerous large spines: upper jaws a little longer. Inhabits deep places near the shores of Europe, Newfoundland, and Greenland; is very fierce and swift; seldom with us exceeds nine or ten inches; follows sharks and other large predacious fishes, lashing them with its spines, which it is able to distend in a formidable manner, till they are forced to abandon its haunts. Body compressed, tapering towards the tail, covered with small spines; above, brown with white dots and lines; beneath, whitish; the flesh is eaten by the Greenlanders.

4. C. gobio. River-bullhead. Miller's Thumb. Smooth; gill covers with a crooked spine, turning inwards. Inhabits clear brooks of Europe, especially Siberia; grows to seven inches long; conceals itself either among the gravel or else under a stone; feeds on aquatic insects and the spawn or young fry of fishes; is like the others of its tribe, a very voracious fish. Body mucous, tapering, covered with small round tubercles, brown, spotted with black, (male cinereous spotted with brown); beneath, white; flesh good and wholesome, and obtaining a red hue by boiling.

COʹTULA. May-weed. A genus of the class syngenesia, order polygamia superflua. Receptacle naked or villous; seeds crowned with a margin; florets of the centre four-cleft, of the ray hardly any. Twenty-two species: widely scattered over the globe, but chiefly Cape-plants or of the south of Europe: they are all herbaceous annuals, about eight inches high, and adorned commonly with yellow flowers.

Cotula fœtida. (*cotula*, dim. of *cos*, a whetstone, from the resemblance of its leaves to a whetstone: or from κοτύλη, a hollow.) Chamæmelum fœtidum. Mayweed. Stinking camomile. This plant; anthemis cotula; receptaculis conicis, paleis setaceis, seminibus nudis, of Linnéus, has a very disagreeable smell; the leaves, a strong, acrid, bitterish taste; the flowers, however, are almost insipid. It is said to have been useful in hysterical affections, but is very seldom employed. See Anthemis.

COTYLA, or Cotula, a dry and liquid measure among the ancients: it was equal to half a sextary.

COTYLE. See Cotyloid cavity.

COTYLE'DON. (κοτυλη, a cavity.) In botany, the lobe, or placenta of the seed, destined to nourish the heart, and then to perish. —Corpus laterale seminis, bibulum, caducum. The lateral body of the seed, bibulous or imbibing moisture, and caducous or falling off quickly. Giseke defines it to be—folium primum germinantis seminis, but this is properly the seed-leaf. In English we commonly call this part the cotyledon or seed-lobe when we speak of it as a portion of the seed, in a quiescent state, and the seed-leaf, when the seed is in a growing state. The greater part of seeds have two lobes; some, however, have more; others only one, and others are said, but perhaps erroneously, to have none. Hence a distinction of all plants into acotyledones, monocotyledones, dicotyledones, polycotyledones; which forms the basis of Jussieu's Natural Arrangement. Placenta, or cotyledon, is the name of the entire substance of the seed, excepting the parts of the corcle, and integuments.

Cotyledon. Navel-wort. A genus of the class decandria, order pentagynia. Calyx five-cleft; corol one petalled; nectariferous scales five, at the base of the germ; capsules five, superior. Twenty-four species, chiefly Cape-plants; but two of them, c. umbilicus and c. lutea, found wild on the moist rocks of our own country. The rest must be preserved in the green-house—where they rise to different heights according to the species, from a foot to a yard and a half high, commonly adorned with yellow, but sometimes with red, flowers; and often in terminal cymes or corymbs.

COTYLOID CAVITY. In anatomy. (*cotyloideus*; from κοτυλη, the name of an old measure, and ειδος, resemblance.) The acetabulum is so termed by some.

COTYTTA, the goddess of all debauchery. Her festivals, called *Cotyttia*, were celebrated by the Athenians, Corinthians, &c. during the night: they were infamous for debauchery and wantonness. Her priests were called *baptæ*.

To COUCH. *v. n.* (*coucher*, French.) 1. To lie down on a place of repose (*Dryden*). 2. To lie down on the knees (*Dryden*). 3. To lie down in ambush (*Hayward*). 4. To lie in a bed, or stratum (*Deuter.*). 5. To stoop, or bend down (*Genesis*).

To Couch. *v. a.* 1. To repose; to lay on a place of repose (*Shakspeare*). 2. To lay down in a bed, or stratum (*Burton*). 3. To bed; to hide in another body (*Bacon*). 4. To involve; to include; to comprise (*Atterbury*). 5. To include secretly; to hide (*South*). 6. To lay close to another (*Spenser*). 7. To fix the spear in the rest (*Dryden*). 8. To depress the film that overspreads the pupil of the eye (*Dennis*).

Couch. *s.* (from the verb.) 1. A seat of repose, on which it is common to lie down dressed (*Dryden*). 2. A bed; a place of repose (*Addison*). 3. A layer, or stratum (*Mortimer*).

Couch, in malting. See Floor.

Couch-grass. See Gramen caninum.

COUCHANT, in heraldry, is understood of a lion, or other beast, when lying down, but with his head raised; which distinguishes the posture of couchant from dormant, wherein he is supposed quite stretched out and asleep.

COUCHE', in heraldry, denotes any thing lying along: thus chevron couché is a chevron lying sideways, with the two ends on one side of the shield, which should properly rest on the base.

CO'UCHEE. *s.* (French.) Bedtime; the time of visiting late at night (*Dryden*).

CO'UCHER. *s.* (from *couch.*) He that couches or depresses cataracts.

CO'UCHFELLOW. *s.* (*couch* and *fellow.*) Bedfellow; companion (*Shakspeare*).

COUCHING OF A CATARACT, in surgery, one of the two chief methods of curing a cataract, by couching with the needle. See Surgery.

COUCO, a country of Africa, in Algiers, governed by an independent king or chief: the country is mountainous, but fertile, and is situated between Algiers and Boujeiah.

COUCOU-TCHACSAC, a town of Asia, in the country of Thibet: four leagues N. Chatcheou.

COUCOUR-HOTUN, a town of Asia, in the country of Thibet: seventy leagues W. Tourfan. Lon. 102. 39 E. Lat. 42. 56 N.

COUCOURON, a town of France, in the department of the Aveiron, and chief place of a canton, in the district of Tanargue: nine leagues W. Privas.

COVE. *s.* 1. A small creek or bay. 2. A shelter; a cover.

COVENANT, in law, is the consent and agreement of two or more persons to do, or not to do, some act, or thing, contracted between them. Also it is the declaration the parties make, that they will stand to such agreement, relating to lands or other things; and is created by deed in writing, sealed and executed by the parties, or otherwise it may be implied in the contract thereto. And if the persons do not perform their covenants, a writ or action of covenant is the remedy to recover damages for the breach of them.

Covenant, in ecclesiastical history, denotes a contract or convention agreed to by the Scotch in the year 1638 for maintaining their religion free from innovation. In 1581, the general assembly of Scotland drew up a confession of faith, or national covenant, condemning episcopal government, under the name of hierarchy, which was signed by James I. and which he enjoined on all his subjects. It was again subscribed in 1590 and 1596. The subscription was renewed in 1638, and the subscribers engaged by oath to maintain religion in the same state as it was in 1580, and to reject all innovations introduced since that time. This oath annexed to the confession of faith received the name of the covenant: as those who subscribed it were called covenanters.

Covenant, in theology, is much used in

connection with other terms; as, 1. *The Covenant of Grace* is that which is made between God and those who believe the gospel, whereby they declare their subjection to him, and he declares his acceptance of them and favour to them. The gospel is sometimes denominated a covenant of grace, in opposition to the Mosaic law. 2. *Covenant of Redemption* denotes, a mutual stipulation, tacit or express, between Christ and the Father, relating to the redemption of sinners by him, previous to any act on Christ's part under the character of Mediator. 3. *Covenant of Works* signifies, in the language of some divines, any covenant whereby God requires perfect obedience from his creatures, in such a manner as to make no express provision for the pardon of offences to be committed against the precepts of it, on the repentance of such supposed offenders, but pronounces a sentence of death upon them.

To CO'VENANT. *v. n.* (from the noun.) To bargain; to stipulate (*South*).

COVENANTE'E. *s.* (from *covenant.*) A party to a covenant; a stipulator; a bargainer (*Ayliffe*).

COVENA'NTER. *s.* (from *covenant.*) One who takes a covenant. A word introduced in the civil wars (*Oxford Reasons*).

CO'VENOUS. *a.* (from *covin.*) Fraudulent; collusive; trickish (*Bacon*).

COVENTRY, a town of Warwickshire, which, with Litchfield (see LITCHFIELD), is a bishop's see. Its market is on Friday. It is a city and county of itself, containing nineteen villages and hamlets, and is governed by a mayor, two bailiffs, sheriffs, ten aldermen, and other officers. This town was surrounded with strong walls which were three miles in circumference, and twenty-six towers, which were demolished by order of king Charles II. in 1662. A parliament was held held here in the reign of Henry IV. called parliamentum indoctum, or the unlearned parliament, because the lawyers were excluded; and another in the reign of Henry VI. called parliamentum diabolicum, or the devil's parliament, from the attainders of the duke of York, the earls of Salisbury, Warwick, and March, and their adherents. In 1801, the number of inhabitants in Coventry was 16034: there were, then, 2930 inhabited, and 204 uninhabited houses. When the cathedral was standing, Coventry possessed a matchless group of churches, all standing within one cemetery. St. Michael's, at present, has probably the most beautiful steeple in Europe: every part of it is so finely proportioned, that sir Christopher Wren spoke of it as a masterpiece of architecture. Lat. 52. 28 N. Lon. 1. 28 W.

COVENTRY BELLS. In botany. See CAMPANULA.

To COVER. *v. a.* (*couvrir*, French.) 1. To overspread any thing with something else (*Shakspeare*). 2. To conceal under something laid over (*Dryden*). 3. To hide by superficial appearances. 4. To overwhelm; to bury (*Watts*). 5. To conceal from notice or punishment. 6. To shelter; to protect (*Cowley*). 7. To incubate; to brood on (*Addison*). 8. to copulate with a female. 9. To wear the hat (*Dryden*).

CO'VER. *s.* (from the verb.) 1. Any thing that is laid over another (*Ray*). 2. A concealment; a screen; a veil (*L'Estrange*). 3. Shelter; defence from weather (*Clarendon*).

CO'VER-SHAME. *s.* Some appearance to conceal infamy. (*Dryden*).

COVERDALE (Miles), an English divine; born in Yorkshire, and educated at Cambridge. Edward VI. made him bishop of Exeter, but in the reign of Mary he went abroad. At the accession of Elizabeth he returned to England, but refused the bishopric. However, he accepted the living of St. Magnus, London, but was at last deprived of it for nonconformity. He died in 1567, aged 81. He assisted Tindal in his translation of the Bible, and the edition of 1540 goes under his name.

CO'VERING. *s.* (from *cover.*) Dress; vesture; any thing spread over another (*South*).

CO'VERLET. *s.* (*couvrelit*, French.) The outermost of the bedclothes; that under which all the rest are concealed (*Spenser*).

CO-VERSED SINE, in trigonometry, a term, denoting the versed-sine of the complement of an arc to a quadrant. That which in most encyclopædias is called the co-versed sine, namely, the remaining part of the diameter after the versed sine is taken from it (*Rees's Cyclo.* art. *Co-versed sine*) is not the co-versed sine, but the sup-versed sine, the versed-sine of the supplemental arc.

CO'VERT. *s.* (*couvert*, French.) 1. A shelter; a defence (*Isaiah*). 2. A thicket, or hiding place (*Addison*).

CO'VERT. *a.* (*couvert*, French.) 1. Sheltered; not open; not exposed (*Pope*). 2. Secret; hidden; private; insidious (*Milt*).

CO'VERT. *a.* (*couvert*, French.) The state of a woman sheltered by marriage under her husband; as covert baron, feme covert. See COVERTURE.

COVERT WAY, or CORRIDOR, in fortification, a space of ground level with the field on the edge of the ditch, three or four fathoms broad, ranging quite round the half moons, and other works toward the country. It has a parapet raised on a level together with its banquets and glacis. The greatest effort in sieges, is to make a lodgment on the covert-way, because the besieged usually pallisade it along the middle, and undermine it on all sides.

CO'VERTLY. *ad.* (from *covert.*) Secretly; closely; in private. (*Dryden*).

CO'VERTNESS. *s.* Secrecy; privacy.

CO'VERTURE. *s.* (from *covert.*) 1. Shelter; defence; not exposure (*Woodward*).

COVERTURE, in law, is applied to the condition of a married woman, who by the laws of this realm is sub protestate viri, and therefore disabled to make bargain with any, to the prejudice of herself or her husband, without his assent and privity, or at least without his allowance and confirmation.

To CO'VET. *v. a.* (*convoiter*, French.) 1.

To desire inordinately; to desire beyond due bounds (*Shakspeare*). 2. To desire earnestly (*Hooker*).

To CO'VET. *v. n.* To have a strong desire.

CO'VETABLE. *a.* (from *covet.*) To be wished for; to be coveted.

CO'VETISE. *s.* (*convoitise*, French.) Avarice; covetousness: not used (*Spenser*).

CO'VETOUS. *a.* (*convoiteux*, French.) 1. Inordinately desirous; eager (*Dryden*). 2. Inordinately eager of money; avaricious. 3. Desirous; eager: in a good sense (*Taylor*).

CO'VETOUSLY. *ad.* (from *covetous.*) Avariciously; eagerly (*Shakspeare*).

CO'VETOUSNESS. *s.* (from *covetous.*) 1. Avarice; eagerness of gain (*Tillotson*). 2. Eagerness; desire: in a neutral sense (*Shak.*).

COVEY. In sporting language, a term applied to a family of patridges, consisting of the cock, hen, and their produce of the year: when the covey or family is broken, they are then denominated according to their number, a leash, implying three; two brace, four; or a single brace, two.

COUGH, (tussis.) A sonorous concussion of the thorax, produced by the sudden expulsion of the inspired air.

Coughs are excited by any acrid substance, either chemically or mechanically applied to those passages through which the air enters. These are lined with a membrane so exceedingly sensible, that it cannot bear the mildest stimulus, such as a drop of cold water, without throwing the muscles serving for respiration into a violent convulsion. Hence the air is expelled with a force sufficient to carry along with it the irritating substance; and thus a cough often becomes not only useful, but indispensably necessary for the preservation of life; as this effort frees the lungs from every kind of stimulating matter, or foulness, which might otherwise be attended with suffocation. A cough is, therefore, an almost inseparable companion of every inflammation of the lungs, as well as every difficulty of breathing; nay, it frequently takes place, when the purest air enters an excoriated sore, or too sensible windpipe, and its tender branches. It may also arise from too great an irritability of the nervous system, or even of some particular part, such as the ear; from worms and impurities in the first passages; obstructions of the abdominal viscera; acrimony clogging the glands, and originating frequently from a catarrhal and schrophulous disposition; hysteric weakness; accumulation of sharp humours in the lungs, &c.

From this view of the causes which produce coughs, it will not be expected that we should expatiate on the treatment of the complaint, under every form and variety of circumstances: it will come more regularly under view in the treatise on MEDICINE.

We may just remark here that it is a prevailing error, that *all* coughs may be cured by the usual mode of administering oily, diluent, and demulcent remedies. At first, indeed, such medicines may be serviceable, to sweeten the acrid humours then secreted, and to allay the irritation. But, as the compounds of oil, spermaceti, &c. easily turn rancid, and even in a fresh state impair the appetite, and affect the breast, we consider them as extremely precarious: hence we would prefer the chewing of the extract of liquorice, gum arabic, and similar substances, to all liquid preparations. If, however, the cough has made such progress as not to yield to the treatment here alluded to, in this case we can confidently recommend the use of the following acid julep: Three ounces of sweet olive oil, two ounces of syrup of capillaire, one ounce of conserve of roses, and thirty drops of strong oil of vitriol; mix them properly, and take a teaspoonful or two, frequently. These ingredients form an excellent medicine for adults; but, for children, we would prefer a julep prepared of eight ounces of rose-water, four ounces of syrup of dry roses, and six drops of vitriolic acid; to be taken by spoonfuls, as often as occasion may require, especially if the cough be accompanied with thirst and febrile heat. In the latter cases, the julep should be diluted with sweet whey, which of itself is an incomparable beverage in catarrhal affections.

COUGH (Chin). See HOOPING-COUGH.

To COUGH. *v. n.* (*kuchen*, Dutch.) To have the lungs convulsed; to make a noise in endeavouring to evacuate the peccant matter from the lungs (*Pope*).

To COUGH. *v. a.* To eject by a cough; to expectorate (*Wiseman*).

CO'UGHER. *s.* (from *cough.*) One that coughs.

CO'VIN. CO'VINE. *s.* A deceitful agreement between two or more, to the hurt of another (*Cowell*).

CO'VING. *s.* (from *cove.*) A term in building, used of houses that project over the ground-plot (*Harris*).

COVINUS, in the middle ages, a kind of war-chariot, in which the Gauls and Britons fought.

COULD, the imperfect preterit of *can*.

COULTER, in husbandry, an iron instrument fixed in the beam of a plough, and serving to cut the edges of each furrow. See PLOUGH.

COUNCIL, or COUNSEL, in a general sense, an assembly of some considerable persons to concert measures relative to the state. In Britain, the law, in order to assist the king in the discharge of his duties, the maintenance of his dignity, and the exertion of his prerogative, hath assigned him different councils to advise with.

1. The high court of parliament. See PARLIAMENT.

2. The peers of the realm are by their birth hereditary counsellors of the crown; and may be called together by the king, to impart their advice in all matters of importance to the realm, either in time of parliament, or, which hath been their principal use, when there is no parliament in being. Accordingly Bracton, speaking of the nobility of his time, says,

they might properly be called "consules à consulendo; reges enim tales sibi associant ad consulendum." And in the law-books it is laid down, that the peers are created for two reasons: 1. Ad consulendum; 2. Ad defendendum, regem: for which reason the law gives them certain great and high privileges; such as freedom from arrests, &c. even when no parliament is sitting; because the law intends, that they are always assisting the king with their counsel for the commonwealth, or keeping the realm in safety by their prowess and valour.

Instances of conventions of the peers, to advise the king, have been in former times very frequent; though now fallen into disuse, by reason of the more regular meetings of parliament. Sir Edward Coke gives us an extract of a record, 5 Henry IV. concerning an exchange of lands between the king and the earl of Northumberland, wherein the value of each was agreed to be settled by advice of parliament (if any should be called before the feast of St. Lucia), or otherwise by advice of the grand council of peers, which the king promises to assemble before the said feast, in case no parliament shall be called.

3. A third council belonging to the king, are, according to sir Edward Coke, his judges of the courts of law, for law-matters. And this appears frequently in the English statutes, particularly 14 Edward III. c. 5. and in other books of law. So that when the king's council is mentioned generally, it must be defined, particularized, and understood, secundum subjectam materiem: "according to the subject matter:" and if the subject be of a legal nature, then by the king's council is understood, his council for matters of law; namely, his judges. Therefore, when by statute 16 Richard II. c. 5. it was made a high offence to import into England any papal bulls, or other processes from Rome; and it was enacted, that the offenders should be attached by their bodies and brought before the king and his council to answer for such offence; here, by the expression of king's council, were understood the king's judges of his courts of justice, the subject-matter being legal: this being the general way of interpreting the word council.

4. But the principal council belonging to the king is his privy council, which is generally, by way of eminence, called the council. For an account of its constitution and powers, see the article Privy-council.

Lord chancellor Bacon in his admirable Essay on Counsel, says "A long table and a square table, or seats about the walls seem things of form, but are things of substance; for at a long table a few at the upper end, in effect, sway all the business; but in the other form there is more use of the counsellors' opinions that sit lower. A king, when he presides in council, let him beware how he opens his own inclination too much in that which he propoundeth; for else counsellors will but take the wind of him, and instead of giving free counsel, will sing him a song of placebo."

Council (Aulic). See Aulic.

Council (Cabinet). See Cabinet.

Council (Common), in the city of London, is a court wherein is made all bye-laws which bind the citizens. It consists, like the parliament, of two houses; an upper, composed of the lord-mayor and aldermen; and a lower, of a number of common-council men, chosen by the several wards, as representatives of the body of the citizens.

Council of war, an assembly of the principal officers of an army or fleet, occasionally called by the general or admiral to concert measures for their conduct with regard to sieges, retreats, engagements, &c.

Council, in church history, an assembly of prelates and doctors, met for the regulating matters relating to the doctrine or discipline of the church.

Council (National), is an assembly of prelates of a nation under their primate or patriarch.

Councils (Oecumenical or General), are assemblies which represent the whole body of the universal church. The Romanists reckon eighteen of them; Bullinger, in his treatise de Conciliis, six; Dr. Prideaux, seven; and bishop Beveridge has increased the number to eight, which, he says, are all the general councils which have ever been held since the time of the first Christian emperor. They are as follows: 1. The council of Nice, held in the reign of Constantine the Great, on account of the heresy of Arius. 2. The council of Constantinople called under the reign and by the command of Theodosius the Great, for much the same end that the former council was summoned. 3. The council of Ephesus, convened by Theodosius the younger at the suit of Nestorius. 4. The council of Calcedon, held in the reign of Martianus, which approved of the Eutychian heresy. 5. The second council of Constantinople, assembled by the emperor Justinian, condemned the three chapters taken out of the book of Theodorus of Mopsuestia, having first decided that it was lawful to anathematize the dead. Some authors tell us, that they likewise condemned the several errors of Origen about the Trinity, the plurality of worlds, and pre-existence of souls. 6. The third council of Constantinople, held by the command of Constantius Pogonatus the emperor, in which they received the definitions of the five first general councils, and particularly that against Origen and Theodorus of Mopsuestia. 7. The second Nicene council. 8. The fourth council of Constantinople, assembled when Louis II. was emperor of the West. The regulations which they made are contained in twenty-seven canons, the heads of which are set down by M. du Pin, to whom the reader is referred.

Council-board. *s.* Council-table; table where matters of state are deliberated (*Claren.*).

CO'UNSEL. *s.* (*consilium*, Latin.) 1. Advice; direction (*Clarendon*). 2. Consultation (*Shakspeare*). 3. Deliberation (*Hooker*). 4.

Prudence; art; machination (*Proverbs*). 5. Secrecy (*Shakspeare*). 6. Those that plead a cause; the counsellors (*Pope*).

Lord Bacon, in the essay cited above, says, "The greatest trust between man and man is the trust of giving counsel; for in other confidences men commit the parts of life, their lands, their goods, their children, their credit, some particular affair; but to such as they make their counsellors they commit the whole: by how much the more are they obliged to all faith and integrity. The wisest princes need not think it any diminution to their greatness, or derogation to their sufficiency, to rely upon counsel. God himself is not without, but hath made it one of the great names of his blessed Son, 'The counsellor.' Solomon hath pronounced that, 'in counsel is stability.' Things will have their first or second agitation: if they be not tossed upon the arguments of counsel, they will be tossed upon the waves of fortune; and be full of inconstancy, doing and undoing, like the reeling of a drunken man."

To Co'unsel. *v. a.* (*consilior*, Latin.) 1. To give advice or counsel to any person (*Sh.*). 2. To advise any thing (*Dryden*).

CO'UNSELLABLE. *a.* (from *counsel*). Willing to receive and follow advice (*Clarend.*)

CO'UNSELLOR. *s.* (from *counsel.*) 1. One that gives advice (*Wisdom*). 2. Confident; bosom friend (*Waller*). 3. One whose province is to deliberate and advise upon publick affairs (*Bacon*).

Counsellor, at law, a person retained by a client to plead his cause in a public court of judicature. See Advocate, Barrister, Counsel, and Serjeant.

Counsellor (Privy). See Privy-Council.

CO'UNSELLORSHIP. *s.* (from *counsellor.*) The office or post of a privy-counsellor (*Bac.*).

To COUNT. *v. a.* (*compter*, French.) 1. To number; to tell (*South*). 2. To preserve a reckoning (*Locke*). 3. To reckon; to place to an account (*Locke*). 4. To esteem; to account; to consider as having a certain character (*Hooker*). 5. To impute to; to charge to (*Rowe*).

To Count. *v. n.* To found an account or scheme (*Swift*).

Count. *s.* (*compte*, French.) 1. Number (*Spenser*). 2. Reckoning (*Shakspeare*).

Count, a nobleman who possesses a domain erected into a county. The dignity is a medium between that of a duke and a baron. (See Earl.) Counts were originally lords of the court, or of the emperor's retinue, and had their name comites *a comitando*. Eusebius tells us, that Constantine divided them into three classes, of the two first the senate was composed: those of the third had no place in the senate, but enjoyed several other privileges of senators. There were counts that served on land, others at sea; some in a civil, and some in a legal capacity. The quality of count is now no more than a title which a king grants upon erecting a territory into a county, with a reserve of jurisdiction and sovereignty to himself. A count has a right to bear on his arms a coronet adorned with three precious stones, and surmounted with three large pearls, whereof those in the middle and extremities of the coronet advance above the rest. See Crown.

Count, in law, signifies the original declaration of complaint in a real action, as a declaration is in a personal one.

Count wheel, in the striking part of a clock, a wheel which moves round once in twelve or twenty-four hours. It is sometimes called the locking-wheel. See Clock.

CO'UNTABLE. *a.* (from *count.*) That may be numbered (*Spenser*).

CO'UNTENANCE. *s.* (*countenance*, Fr.) 1. The form of the face. 2. Air; look (*Sh.*). 3. Calmness of look; composure of face (*Sw.*). 4. Confidence of mien; aspect of assurance (*Clarendon. Spratt*). 5. Kindness or ill-will, as it appears upon the face (*Spenser*). 6. Patronage; appearance of favour; support; appearance on any side (*Davies*). 7. Superficial appearance; show (*Ascham*).

To Co'untenance. *v. a.* (from the noun.) 1. To support; to patronise (*Addison*). 2. To make a show of (*Spenser*). 3. To act suitably to any thing (*Shakspeare*). 4. To encourage; to appear in defence (*Wot.*).

CO'UNTENA'NCER. *s.* (from *countenance.*) One that countenances or supports another.

CO'UNTER. *s.* (from *count.*) 1. A false piece of money used as a means of reckoning (*Swift*). 2. The table on which goods are viewed, and money told, in a shop (*Dryden*). 3. Counter *of a Horse*, is that part of a horse's forehand that lies between the shoulder and under the neck (*Farrier's Dict.*).

Co'unter. *ad.* (*contre*, French.) 1. Contrary to; in opposition to (*South*). 2. The wrong way (*Shakspeare*). 3. Contrarywise (*Locke*).

To COUNTERA'CT. *v. n.* (*counter* and *act.*) To hinder any thing from its effect by contrary agency (*South*)

To COUNTERBA'LANCE. *v. a.* (*counter* and *balance.*) To act against with an opposite weight (*Boyle*).

Counterba'lance. *s.* Opposite weight; equivalent power (*Locke*).

COUNTER BARRY, or Contre barre, in heraldry, is the same as our bendy sinister per bend counterchanged.

COUNTERBOND, a bond of indemnification, given to one who has given his bond as a security for another's payment of a debt, or the faithful discharge of his office or trust.

To COUNTERBU'FF. *v. a.* (*counter* and *buff.*) To impel; to strike back (*Dryden*).

Counterbu'ff. *s.* A stroke that produces a recoil (*Sidney*).

CO'UNTERCASTER. *s.* (*counter* and *caster.*) A book-keeper; a caster of accounts (*Shakspeare*).

CO'UNTERCHANGE. *s.* (*counter* and *change.*) Exchange; reciprocation (*Shaks.*).

To Co'unterchange. *v. a.* To give and receive.

COUNTERCHANGED, in heraldry, is when any field or charge is divided or parted by any line or lines of partition, consisting all interchangeably of the same tinctures.

COUNTERCHA'RM. *s.* (*counter* and *charm.*) That by which a charm is dissolved (*Pope*).

To Countercha'rm. *v. a.* To destroy the effect of an enchantment (*Decay of Piety*).

To COUNTERCHE'CK. *v. a.* (*counter* and *check.*) To oppose.

Counterche'ck. *s.* Stop; rebuke (*Sh.*).

COUNTERDEED, a secret writing either before a notary or under a private seal, which destroys, invalidates, or alters a public one.

To COUNTERDRA'W. *v. a.* (from *counter* and *draw.*) To copy a design by means of an oiled paper, whereon the strokes, appearing through, are traced with a pencil (*Chambers*).

COUNTERERMINE, in heraldry, is the contrary to ermine, being a black field with white spots.

COUNTERE'VIDENCE. *s.* (*counter* and *evidence.*) Testimony by which the deposition of some former witness is opposed (*Burn*).

To CO'UNTERFEIT. *v. a.* (*contrefaire*, Fr.) 1. To copy with an intent to pass the copy for an original; to forge (*Waller*). 2. To imitate; to copy; to resemble (*Tillotson*).

Co'unterfeit. *a.* (from the verb.) 1. That is made in imitation of another; forged; fictitious (*Locke*). 2. Deceitful; hypocritical (*Roscommon*).

Co'unterfeit. *s.* (from the verb.) 1. One who personates another; an impostor (*Bacon*). 2. Something made in imitation of another; a forgery (*Tillotson*).

COUNTERFEITS, in our law, are persons that obtain any money or goods, by counterfeit letters or false tokens, who, being convicted before justices of assize, or of the peace, &c. are to suffer such punishment as shall be thought fit to be inflicted, under death, as imprisonment, pillory, &c.

CO'UNTERFEITER, *s.* (from *counterfeit.*) A forger; one who contrives copies to pass for originals (*Camden*).

CO'UNTERFEITLY. *ad.* (from *counterfeit.*) Falsely; with forgery (*Shak.*).

COUNTERFE'RMENT. *s.* (*counter* and *ferment.*) Ferment opposed to ferment (*Add.*).

COUNTERFE'SANCE. *s.* (*contrefaisance*, Fr.) The act of counterfeiting; forgery (*Spenser*).

COUNTERFISSURE, a surgical term, denoting a fissure or fracture, produced by a blow or fall, in a part of the body (suppose the occipital bone) quite remote from, or even opposite to, that which had been exposed to the mechanical violence. This accident may happen in many parts, but it occurs most frequently in the head, where, also, it is the most dangerous.

COUNTER-FORTS, in fortification, are bodies of masonry built behind walls, from distance to distance, and cemented with them, in order to strengthen them, and lessen the pressure of the earth behind them. There are commonly eighteen feet between the centre of one counterfort and that of the next.

COUNTERFUGUE, in music, a fugue in which the subjects move in contrary directions.

COUNTERGA'GE. *s.* (from *counter* and *gage.*) A method used to measure the joints, by transferring the breadth of a mortise to the place where the tenon is to be (*Chambers*).

COUNTERGUA'RD. *s.* (from *counter* and *guard.*) A small rampart with parapet and ditch (*Military Dict.*).

COUNTERLI'GHT. *s.* (from *counter* and *light.*) A window or light opposite to any thing (*Chambers*).

To COUNTERMA'ND. *v. a.* (*contremander*, Fr.) 1. To order the contrary to what was ordered before; to repeal a command (*South*). 2. To contradict the orders of another (*Hold.*) 3. To prohibit (*Harvey*).

Counterma'nd. *s.* (*contremand*, Fr.) Repeal of a former order (*Shakspeare*).

To COUNTERMA'RCH. *v. n.* (*counter* and *march.*) To march backward.

Countermarch. *s.* 1. Retrocession; march backward (*Collier*). 2. Change of measures; alteration of conduct (*Burnet*).

COUNTER-MARK, a second or third mark, put on any thing marked before.

The word is applied, in commerce, to the several marks put on a bale of goods belonging to several merchants; that it may not be opened but in the presence of them all, or their agents.

In goldsmiths' works, &c. the counter-mark is the mark, or punchion of the hall, or company, to shew the metal is standard, added to that of the artificer who made it.

Counter-mark of a horse, is an artificial cavity, which the jockeys make in the teeth of horses that have outgrown the natural mark; to disguise their age, and make them appear as if they were not above eight years old.

Counter-mark of a medal, is a mark added to a medal, a long time after its being struck.

COUNTER-MINE, in war, a subterraneous vault, running the whole length of a wall, three feet broad, and six deep, with several holes and apertures therein: contrived to prevent the effect of mines, in case the enemy should make any to blow up the wall.

This kind of counter-mine, however, is now of little use.

The modern counter-mine is a well, or pit, and a gallery, sunk on purpose, till it meet the enemy's mine, and prevent the effect: it being first pretty well known whereabouts that is.

Countermine signifies also, 1. Means of opposition; means of counteraction (*Sidney*). 2. A stratagem by which any contrivance is defeated (*L'Estrange*).

To Countermine. *v. a.* 1. To delve a

passage into an enemy's mine. 2. To counterwork; to defeat by secret measures (*Decay of Piety*).

COUNTERMOTION. *s.* (*counter* and *motion.*) Contrary motion (*Digby*).

COUNTERMU'RE. *s.* (*contremure*, Fr.) A wall built up behind another wall (*Knolles*).

COUNTERNA'TURAL. *a.* (*counter* and *natural.*) Contrary to nature (*Harvey*).

COUNTERNOI'SE. *s.* (*counter* and *noise.*) A sound by which any other noise is overpowered (*Calamy*).

COUNTERO'PENING. *s.* (*counter* and *opening.*) An aperture or vent on the contrary side (*Sharp*).

COUNTER-OPENING. (*contra apertura.*) In surgery. An opening made in any part of an abscess opposite to one already in it. This is often done in order to afford a readier egress to the collected pus.

COUNTERPA'CE. *s.* (*counter* and *pace.*) Contrary measure; attempts in opposition to any scheme (*Swift*).

CO'UNTERPANE. *s.* (*contrepoint*, Fr.) A coverlet for a bed, or any thing else woven in squares (*Shakspeare*).

COUNTERPA'RT. *s.* (*counter* and *part.*) The correspondent part (*L'Estrange*).

COUNTERPLE'A. *s.* (from *counter* and *plea.*) In law, a replication (*Cowell.*)

To COUNTERPLO'T. *v. a.* (*counter* and *plot.*) To oppose one machination by another.

COUNTERPLO'T. *s.* An artifice opposed to an artifice (*L'Estrange*).

CO'UNTERPOINT. *s.* A coverlet woven in squares.

CO'UNTERPOINT, in music, the art of disposing several parts or airs together, in such a manner as to make an agreeable whole or concert. In general, every harmonious composition, that is, of many parts, was called counterpoint. Its name was deduced from the circumstance that before notes of different measure were in use the way of composing was to set pricks or points one against the other, to denote the concords; the length or measure of which points were sung according to the quantity of the words or syllables which were applied to them: and because, in composing our descant, we set note against note, as they did point againt point, from thence it still retains the name of counterpoint.

Counterpoint is divided into simple and figurative; simple counterpoint, or the harmony of concords, consists of perfect as well as imperfect concords, and may therefore be denominated perfect or imperfect, according as the concords are whereof it is composed.

For the rules of counterpoint, with regard to the succession of concords, it must be observed, that, as much as can be, the parts may proceed by a contrary motion; that is, the bass may ascend where the treble descends, and vice versa. In a sharp key the bass descends gradually from the fifth to the fourth; the last, in that case should never have its proper harmony applied to it; but the notes that was harmony in the preceding fifth must be continued on the fourth: thirds and fifths may follow one another as often as one has a mind. Now to dispose the concords, or the natural notes and their octaves, in any key in a simple counterpoint, observe, with regard to the distinction into perfect or imperfect harmony, this general rule: to the key, to the fourth and the fifth, perfect harmony must be joined; to the second, third, and seventh, an imperfect harmony is indispensable; to the sixth, either a perfect or imperfect harmony; but when the key is flat, an imperfect harmony given to the sixth. Figurative counterpoint is of two kinds: in one, discords are introduced occasionally, as passing notes, serving only as transitions from concord to concord: in the other, the discords have a considerable part in the harmony, but must be brought in by judicious preparation. See DESCANT.

To COUNTERPO'ISE. *v. a.* (*counter* and *poise.*) 1. To counterbalance; to be equiponderant to; to act against with equal weight (*Digby*). 2. To produce a contrary action by an equal weight (*Wilkins*). 3. To act with equal power against any person or cause (*Spenser*).

CO'UNTERPOISE. *s.* 1. Equiponderance; equivalence of weight (*Boyle*). 2. The state of being placed in the opposite scale of the balance (*Milton*). 3. Equipollence; equivalence of power (*Bacon*).

COUNTERPO'ISON. *s.* (*counter* and *poison.*) Antidote (*Arbuthnot*).

COUNTERPRE'SSURE. *s.* (*counter* and *pressure.*) Opposite force; power acting in contrary directions (*Blackmore*).

COUNTERPRO'JECT. *s.* (*counter* and *project.*) Correspondent part of a scheme (*Swift*).

To COUNTERPRO'VE. *v. a.* (*counter* and *prove.*) To take off a design in black lead, or red chalk, by passing it through the rolling-press with another piece of paper (*Ch.*).

To COUNTERRO'L. *v. a.* (*counter* and *roll.*) To preserve the power of detecting frauds by a counter-account; to control.

COUNTERRO'LMENT. *s.* (from *counterrol.*) A counter account; controlment (*Bac.*).

COUNTERSCARP, in fortification, is properly the exterior talus or slope of the ditch; but it is often taken for the covered way and the glacis. In this sense, we say, the enemy have lodged themselves on the counterscarp.

COUNTERSCARP (Angle of the), is that made by the two sides of the counterscarp, meeting before the middle of the curtin.

To COUNTERSI'GN. *v. a.* (*counter* and *sign.*) To sign an order or patent of a superiour, in quality of secretary, to render it more authentick (*Chambers*).

COUNTER-TENOR, in music, a term applied to the highest natural male voice.

COUNTERTI'DE. *s.* (*counter* and *tide.*) Contrary tide (*Dryden*).

COUNTERTI'ME. *s.* (*contretemps*, Fr.) Defence; opposition (*Dryden*).

COUNTERTU'RN. *s.* (*counter* and *turn.*) The height and full growth of the play, which destroys expectation (*Dryden*).

To COUNTERVA'IL. *v. a.* (*contra* and *vuleo*, Latin.) To be equivalent to; to have equal force or value; to act against with equal power (*Hooker. Wilkins*).

COUNTERVA'IL. *s.* (from the verb.) 1. Equal weight; power or value sufficient to obviate any effect or objection. 2. That which has equal weight or value with something else (*South*).

COUNTERVI'EW. *s.* (*counter* and *view.*) 1. Opposition; a posture in which two persons front each other (*Milton*). 2. Contrast; a position in which dissimilar things illustrate each other (*Swift*).

To COUNTERWO'RK. *v. a.* (*counter* and *work.*) To counteract; to hinder any effect by contrary operations (*Pope*).

CO'UNTESS. *s.* (*comitissa*, Lat. *comtesse*, French.) The lady of an earl or count (*Dr.*).

CO'UNTING-HOUSE. *s.* (*count* and *house.*) The room appropriated by traders to their books and accounts. See COMPTING-HOUSE.

CO'UNTLESS. *a.* (from *count.*) Innumerable; without number (*Donne*).

COU'NTRY. *s.* (*contrée*, Fr.) 1. A tract of land; a region (*Spratt*). 2. The parts of a region distant from cities or courts; rural parts (*Spectator*). 3. The place which any man inhabits (*Shak.*). 4. The place of one's birth; the native soil (*Spratt*). 5. The inhabitants of any region *Shak.*).

COU'NTRY. *a.* 1. Rustick; rural; villatick (*Norris*). 2. Of an interest opposite to that of courts; as, the *country* party (*Locke*). 3. Peculiar to a region or people (*Maccab.*). 4. Rude; ignorant; untaught (*Dryden*).

COUNTRY-DANCE, a lively pointed air, calculated for dancing. The country-dance is said to be of English origin, though now transplanted into almost every country in Europe. No rules have ever been laid down for the composition of a country-dance, nor is it, indeed, confined to any particular measure. See CONTRE-DANCE.

CO'UNTRYMAN. *s.* (from *country* and *man.*) 1. One born in the same country (*Locke*). 2. A rustick; one that inhabits the rural parts; not a townsman (*Graunt*). 3. A farmer; a husbandman (*L'Estrange*).

COUNTRY-WAKES. See WAKES.

COUNTY, in geography, originally signified the territory of a count or earl, but now it is used in the same sense with shire; the one word coming from the French, the other from the Saxon. In this view, a county is a circuit or portion of the realm, into fifty-two of which, the whole land, England and Wales, is divided for its better government, and the more easy administration of justice.

COUNTY-CORPORATE, is a title given to several cities, or ancient boroughs, on which the English monarchs have thought fit to bestow extraordinary privileges; annexing to them a particular territory, land, or jurisdiction; and making them counties of themselves, to be governed by their own sheriffs and magistrates.

COUNTY-COURT, in English law, a court incident to the jurisdiction of the sheriff. It is not a court of record, but may hold pleas of debt or damages under the value of 40s. Over some of which causes these inferior courts have by the express words of the statute of Gloucester, a jurisdiction totally exclusive of the king's superior courts.

The freeholders of the county are the real judges in this court, and the sheriff is the ministerial officer. The great conflux of freeholders, which are supposed always to attend at the county-court, is the reason why all acts of parliament at the end of every session were wont to be there published by the sheriff; why all outlawries of absconding offenders are there proclaimed; and why all popular elections which the freeholders are to make, as formerly of sheriffs and conservators of the peace, and still of coroners, verderers, and knights of the shire, must ever be made in pleno comitatu, or in full county-court. By the statute 2 Edward VI. c. 25. no county-court shall be adjourned longer than for one month, consisting of twenty-eight days.

COUNTIES PALATINE. Of the fifty-two counties, there are three of special note, which are therefore termed counties palatine, as Lancaster, Chester, and Durham. The two latter are such by prescription, or immemorial custom, at least as old as the Norman conquest; the former was created by Edward III. in favour of Henry Plantagenet, first earl and duke of Lancaster. Pembroke also, and Hexham, were anciently counties palatine; which last belonged to the archbishop of York, and was stripped of its privilege in the reign of queen Elizabeth, and reduced to be a part of the county of Northumberland; the former was abolished in 27 Hen. VIII. the latter in 14 Eliz.

The chief governors of these counties palatine, heretofore, by a special charter from the king, sent out all writs in their own names; and touching justice, did all things as absolutely as the king himself in other counties, only acknowledging him their superior and governor: whence palatine, *a palatio*, because the owners of them had *jura regalia* as fully as the king hath in his palace. These privileges were probably granted to them, because they bordered on enemies countries, viz. Wales and Scotland. But in Henry the Eighth's time, the said power was much abridged; though still all writs are witnessed in their names, and all forfeitures for treason by the common law accrue to them. The Isle of Ely has been sometimes reckoned among the counties palatine, though it is properly only a royal franchise; the bishop having, by grant of king Henry I. jura regalia within the Isle of Ely, whereby he exercises a jurisdiction over all causes, criminal and civil.

There is a court of chancery in the counties palatine of Lancaster and Durham, over which there are chancellors.

COUNTY-RATE. By the 12th Geo. II. c. 29. the justices at their general or quarter sessions, or the greater part of them (and by 13 Geo. II. c. 18. justices of liberties and franchises not subject to county-commissioners), shall have power to make one general county-rate, to answer all former distinct rates, which shall be assessed on every parish, &c. and collected and paid by the high constables of hundreds to treasurers appointed by the justices, which money shall be deemed the public stock, &c.; but appeal lies by the churchwardens and overseers against the rate of any particular parish. (22 Geo. III. c. 17.) This rate is,

For the repairing of bridges and highways thereto adjoining, and salaries for the surveyors of bridges; for building and repairing county-gaols; for repairing shire-halls; for the salary of the master of the house of correction, and relieving the weak and sick in his custody; for the relief of the prisoners in the king's bench and marshalsea prisons, and of poor hospitals in the county, and of those who shall sustain losses by fire, water, the sea, or other casualties, and other charitable purposes for the relief of the poor, as the justices in sessions shall think fit; for the relief of the prisoners in the county-gaol; for the preservation of the health of the prisoners, &c. &c.

COVORDEN, a town of the United Provinces, in Overyssel, with a fortress in the marshes, strong both by nature and art. It is thirty-five miles N.E. of Deventer. Lon. 6. 33 E. Lat. 50. 42 N.

COUP, (Fr.) a touch or stroke. In music, *coup de langue*, with flute-players, is the accent given to notes by the tip of the tongue, instead of slurring them inarticulately.

COUP-DE-MAIN, in military affairs, implies a desperate resolution in all small expeditions of surprise, &c. The favourable side of the proposed action must ever be viewed; for if what may happen, arrive, or fall out, is chiefly thought upon, it will at the very best not only greatly discourage, but in general it will produce a total failure. The very name of an expedition implies risk, hazard, precarious warfare, and a critical but desperate operation or coup-de-main.

COUP-D'ŒIL, in a military sense, signifies that fortunate aptitude of eye in a general or other officer, by which he is enabled at one glance on the map to see the weak parts of an enemy's country, or to discern the strong ones of his own. By possessing a ready coup-d'œil, a general may surmount the greatest difficulties, particularly in offensive operations. On a small scale this faculty is of the greatest utility. Actions have been recovered by a sudden conception of different openings upon the enemy, which could only be ascertained by a quick and ready eye, during the rapid movements of opposing armies.

COUPAR, or COUPER, the county-town of Fife, in Scotland. Lat. 56. 18 N. Lon. 2. 54 W.

COUPED, *coupé*, in heraldry, is used to express the head or any limb of an animal cut off from the trunk smooth; distinguishing it from that which is called erased, that is, forcibly torn off, and therefore is ragged and uneven.

COUPED is also used to signify such crosses, bars, bends, chevrons, &c. as do not touch the sides of the escutcheon, but are, as it were, cut off from them.

COUPE'E, a motion in dancing, wherein one leg is a little bent and suspended from the ground, while with the other a motion is made forwards.

CO'UPLE. *s.* (*couple*, French.) 1. A chain or tie that holds dogs together (*Shak.*). 2. Two; a brace (*Locke*). 3. A male and his female (*Bentley*).

To CO'UPLE. *v. a.* (*copulo*, Latin.) 1. To chain together (*Shakspeare*). 2. To join one another (*South*). 3. To marry; to wed (*Sidney*).

To CO'UPLE. *v. n.* To join in embraces (*Bacon*).

COUPLE-BEGGAR. *s.* (*couple* and *beggar.*) One that makes it his business to marry beggars to each other (*Swift*).

COUPLE-CLOSS, in heraldry, the fourth part of a chevron, never borne but in pairs, except there is a chevron between them.

CO'UPLET, a division of a hymn, ode, song, or the like, wherein an equal number, or equal measure, of verses, is found in each part. The word is French, formed from the Latin *copula*. In odes, these divisions are more ordinarily called strophes. By an abuse, couplet is sometimes used to signify a couple of verses.

COUPLING-BOX, among mill-wrights, is a contrivance very frequently used in large mills, by means of which two parts of any shaft (intended to convey a rotatory motion from one part of a mill to another) may be quickly disunited or connected, in order to stop or to put in motion any particular machine worked by that shaft.

COUPURE, in fortification, are passages sometimes cut through the glacis, of about twelve or fifteen feet broad, in the re-entering angle of the covert-way, to facilitate the sallies of the besieged. They are sometimes made through the lower curtin, to let boats into a little haven built on the rentrant angle of the counterscarp of the outworks.

COURAGE, *s.* is often defined as synonymous with bravery; but this, where there are not wisdom and virtue to temper it, is a lawless quality. It is the property of this courage, that it acquits itself honourably in the view of the public, but fails a man when there are no such props to support it. He who appears unappalled in the field of battle, and perhaps would do the same on a scaffold, trembles when death approaches him on a sick bed; agreeably to the language of the poet;

"Who combats bravely, is not therefore brave;
"But dreads a death-bed as the meanest slave."

True courage, says Mr. Grove, is such a firmness and resolvedness of soul, inspired by a sense of what is just and honourable, as amidst all the dangers and evils to which human life is incident, enables a man steadily to pursue the dictates of conscience and prudence. In this definition is contained the seat of this virtue, the object, and the measure of it. The seat of this virtue is the rational soul; from whence it follows, that brawny limbs, a firm constitution, and fermented blood, are not the things which make up a hero. The objects of courage are the evils of life; whereof some are unavoidable, as earthquakes, inundations, sickness, fire, and the like: others are avoidable, but not without quitting our honesty; such are all the difficulties and dangers which may happen to attend the faithful discharge of our duty, and all the inconveniences which we suffer for our adherence to truth. The rule or measure of courage is a conscientious prudence, which cuts off the soldier who fights merely for pay or fame, the man of false honour who gives or accepts the challenge, and the self-murderer, from any claim to this virtue. The truly courageous man does every thing for the sake of something truly honourable; and for the obtaining of this end, prudence advises to proper means. This courage does not exclude all fear, but the fear which accompanies it respects not persons so much as things: not to fear infamy, as Aristotle observes, is a sign, not of courage, but of impudence; not to fear God is a sign of impiety.

COURA'GEOUS. *a.* (from *courage.*) Brave; daring; bold; adventurous (*Amos*).

COURA'GEOUSLY. *ad.* Bravely; stoutly; boldly (*Bacon*).

COURA'GEOUSNESS. *s.* Bravery; boldness; spirit; courage (*Maccabees*).

COU'RANT, a French term synonymous with current, *i. e.* running.

COURANT, a dance. See CORANT.

COURAP, the modern name for a distemper very common in Java and other parts of the East Indies. It is a sort of herpes or itch on the arm-pits, groins, breast, and face; the itching is almost perpetual; and the scratching is followed by great pain and a discharge of matter, which makes the linen stick so to the skin, as not easily to be separated without tearing off the crust. Courap is a general name for any sort of itch; but this distemper is thus called by way of eminence. It is so contagious that few escape it. For the cure, gentle and repeated purging is used, and externally, the ointment of nitrated quicksilver.

To COURB. *v. n.* (*courber*, Fr.) To bend; to bow: not in use (*Shakspeare*).

COURBARIL, in botany. See HYMENÆA.

COURIER, or CURRIER (from the Fr. *courir*, to run,) a messenger sent post or express, to carry dispatches. Antiquity, too, had its couriers. We meet with two kinds: 1. Those who ran on foot, called by the Greeks *hemerodromi*, q. d. couriers of a day. Pliny, Corn. Nepos, and Cæsar, mention some of these who would run twenty, thirty, thirty-six, and in the circus even forty leagues per day. 2. Riding couriers, *cursores equitantes*, who changed horses as the modern couriers do. Xenophon attributes the first couriers to Cyrus. Herodotus says, they were very common among the Persians, and that there was nothing in the world more swift than these kind of messengers. "That prince (says Xenophon) examined how far a horse would go in a day, and built stables, at such distances from each other, where he lodged horses, and persons to take care of them; and at each place kept a person always ready to take the packet, mount a fresh horse, and forward it to the next stage; and thus quite through his empire." But it does not appear, that either the Greeks or Romans had any regular fixed couriers till the time of Augustus; under that prince they travelled in cars; though it appears from Socrates they afterwards went on horseback. Under the western empire they were called *viatores*; and under that of Constantinople, *cursores*; whence the modern name. See POST.

COURIE'R, in ornithology. See CORRIRA.

COURLAN, in ornithology. See ARDEA.

COURLAND, a territory and duchy of Livonia, in Poland, but at the division of 1772, was annexed to Russia. It is bounded on the N. by the river Dwina, on the E. by Lithuania, on the S. by Samojitia, and on the W. by the Baltic Sea, being about 130 miles long, and 30 broad. Its principal town is Mittau, whose inhabitants are Protestants.

COURSE. *s.* (*course*, French.) 1. Race; career (*Cowley*). 2. Passage from place to place (*Denham*). 3. Tilt; act of running in the lists (*Sidney*). 4. Ground on which a race is run. 5. Tract or line in which a ship sails, or any motion is performed. 6. Sail; means by which the course is performed (*Raleigh*). 7. Progress from one gradation to another; process (*Shakspeare*). 8. Order of succession (*Corinthians*). 9. Stated and orderly method (*Shakspeare*). 10. Series of successive and methodical procedure (*Wiseman*). 11. The elements of an art exhibited and explained, in a methodical series (*Chambers*). 12. Conduct; manner of proceeding (*Knolles*). 13. Method of life; train of actions (*Prior*). 14. Natural bent; uncontrolled will (*Temple*). 15. Catamenia (*Harvey*). 16. Orderly structure (*James*). 17. A continued range of stones, level, or of the same height (*Harris*). 18. Series of consequences (*Garth*). 19. Number of dishes set on at once upon the table (*Swift*). 20. Regularity; settled rule. 21. Empty form (*L'Estrange*).

COURSE OF PLINTHS, is the continuity of

a plinth of stone or plaster in the face of a building; to mark the separation of the stories.

COURSE, in navigation, the point of the compass, or horizon, which a ship steers on; or the angle which the rhumb line on which it sails makes with the meridian; being sometimes reckoned in degrees, and sometimes in points of the compass.

When a ship sails either due north or south, she sails on a meridian, makes no departure, and her distance and difference of latitude are the same.

When she sails due east or west, her course makes right angles with the meridian, and she sails either upon the equator or a parallel to it; in which case she makes no difference of latitude, but her distance and departure are the same.

But when the ship sails between the cardinal points, on a course making always the same oblique angle with the meridians, her path is then the loxodromic curve, being a spiral cutting all the meridians in the same angle, and terminating in the pole.

To COURSE. *v. a.* (from the noun). 1. To hunt; to pursue (*Shakspeare*). 2. To pursue with dogs that hunt in view. 3. To put to speed; to force to run (*May*).

To COURSE. *v. n.* To run; to rove about (*Shakspeare*).

COURSER. *s.* (*coursier*, French.) 1. A swift horse; a war horse (*Pope*). 2. One who pursues the sport of coursing hares (*Hanmer*).

COURSES, a name by which the principal sails of a ship are distinguished, viz. the mainsail, the fore-sail, and the mizen; the mizen-stay-sail and fore-sail are also sometimes comprehended in this denomination; as are the main-stay sails of all brigs and schooners. See SAIL.

COURSING. The pursuit of game with grey-hounds; an amusement treated of by Arrian, so long ago as the middle of the second century of the Christian æra.

"In our country," observes Mr. Daniel, "during the reign of king John, greyhounds were frequently received by him as payment in lieu of money, for the renewal of grants, fines, and forfeitures, belonging to the crown. The following extracts prove this monarch to have been exceedingly partial to this kind of dogs. A fine paid A. D. 1203, mentions five hundred marks, ten horses, and ten leashes of greyhounds. Another, in 1210, one swift running horse, and six greyhounds.

"In the days of Elizabeth, when she was not disposed herself to hunt, she was so stationed as to see the coursing of deer with greyhounds. At Cowdrey, in Sussex, the seat of lord Montecute (now lady Montague's), A. D. 1591, one day after dinner, the queen saw from a turret, 'sixteen bucks, all having fayre lawe, pulled down with greyhounds in a launde, or lawn.'"

Coursing was formerly extended to the deer, the fox, and the hare; and much ceremony was observed in park and paddock-coursing with the first of these three, even in the royal presence. It is, however, now principally confined to the hare, except in the season for fawn-killing; and even for the hare it is not in universal practice, although some counties are still much attached to the sport.

The laws of coursing were arranged in the reign of queen Elizabeth, by the duke of Norfolk, and were sanctioned by the acquiesence of the nobility, gentry, and sporting world, who then followed the diversion; and are still appealed to as forming a criterion for the decision of bets in the present day. The person originally appointed to let loose the greyhounds, denominated *feuterer*, was to receive into his slips (or thongs) those matched to run against each other, as soon as he came into the field; and then to follow the hare-finder, or him who was to start the hare, until he came to the form; and no horse or footmen were to go before, or on either side, but directly behind, for the space of about forty yards.

Laws.—A hare not to be coursed with more than a brace of greyhounds. The hare-finder to give the hare three soho's! before he put her from her form; to give notice to the dogs, that they may attend her starting. The hare to have twelve score yards law before the dogs were loosed, unless the small distance from cover would not admit it without danger of immediately losing her. The dog that gave the first turn during the course, if there were neither cote, slip, nor wrench, won. A cote served for two turns, and two trippings or jerkins for a cote: if the hare did not turn quite about, she only wrenched, and two wrenches stand for a turn. If there were no cotes given between a brace of greyhounds, but that one of them served the other at turning, then he that gave the hare most turns, won; and if one gave as many turns as the other, then he that bore the hare, won. If one dog gave the first turn, and the other bore the hare, he that bore the hare, won. A go-by, or bearing the hare, was equivalent to two turns. If neither dog turned the hare, he that led last to the covert, won. If one dog turned the hare, served himself, and turned her again, it was as much as a cote; for a cote was esteemed two turns. If all the course were equal, the dog that bore the hare, won; if the hare was not borne, the course was adjudged dead. If a dog fell in a course, and yet performed his part, he might challenge the advantage of a turn more than he gave. If a dog turned the hare, served himself, and gave divers cotes, and yet in the end stood still in the field, the other dog, if he ran home to the cover, although he gave no turn, was adjudged the winner. If by accident a dog was rode over in his course, the course was void; and he that did the mischief was to make reparation for the damage. If a dog gave the first and last turn, and there was no other advantage between them, he that gave the odd turn, won. He that came in first at the death, took up the hare, saved her from being torn, cherished the dogs, and cleansed their mouths

from the wool, was adjudged to have the hare for his trouble. Those who were appointed judges of the course, were to give their decision before they departed out of the field.

COURT, an appendage to a house, or habitation; consisting of a piece of ground inclosed with walls, but open upwards.

The word is formed from the French *cour*, and that from the Latin *cohors*: whence also *cortis* and *curtis* are sometimes used for the same. In the laws of the Germans there is one article, *De eo qui in curte regis furtum commiserit*; and another, *De eo qui in curte ducis hominem occiderit.* Others derive court from the Gaulish *cors*, formed of *cohors*, and *cohors* from χορτος. See COHORT.

COURT is also used for the palace or place where a king or sovereign prince resides.

COURT, in a law sense, is defined to be a place wherein justice is judicially administered. And as, by our excellent constitution, the sole executive power of the laws is vested in the person of the king, it will follow, that all courts of justice, which are the medium by which he administers the laws, are derived from the power of the crown. For whether created by act of parliament or letters patent, or subsisting by prescription (the only methods by which any court of judicature can exist), the king's consent in the two former is expressly, and in the latter impliedly, given. In all these courts the king is supposed, in contemplation of law, to be always present; but as that is in fact impossible, he is there represented by his judges, whose power is only an emanation of the royal prerogative.

For the more speedy, universal, and impartial administration of justice between subject and subject, the law hath appointed a prodigious variety of courts, some with a more limited, others with a more extensive jurisdiction; some constituted to inquire only, others to hear and determine; some to determine in the first instance, others upon appeal and by way of review. (See LAW, and the respective articles.) One distinction may be here mentioned, that runs throughout them all; viz. that some of them are courts of record, others not of record. A court of record is that where the acts and judicial proceedings are enrolled in parchment for a perpetual memorial and testimony: which rolls are called the records of the courts, and are of such high and supereminent authority, that their truth is not to be called in question. For it is a settled rule and maxim, that nothing shall be averred against a record, nor shall any plea, or even proof, be admitted to the contrary. And if the existence of a record be denied, it shall be tried by nothing but itself; that is, upon bare inspection whether there be any such record or no; else there would be no end of disputes. But if there appear any mistake of the clerk in making up such record, the court will direct him to amend it. All courts of record are the king's courts, in right of his crown and royal dignity, and therefore no other court hath any authority to fine or imprison; so that the very erection of a new jurisdiction with power of fine or imprisonment, makes it instantly a court of record.—A court not of record is the court of a private man; whom the law will not intrust with any discretionary power over the fortune or liberty of his fellow-subjects. Such are the courts-baron incident to every manor, and other inferior jurisdictions: where the proceedings are not enrolled or recorded; but as well their existence as the truth of the matters therein contained shall, if disputed, be tried and determined by a jury. These courts can hold no plea of matters cognizable by the common law, unless under the value of 40s. nor of any forcible injury whatsoever, not having any process to arrest the person of the defendant.

In every court there must be at least three constituent parts, the actor, or plaintiff, who complains of an injury done; the reus, or defendant, who is called upon to make satisfaction for it; and the judex, or judicial power, which is to examine the truth of the fact, to determine the law arising upon that fact, and, if any injury appears to have been done, to ascertain, and by its officers to apply the remedy. It is also usual in the superior courts to have attorneys, and advocates or counsel, as assistants. See ATTORNEY and COUNSEL.

COURT-BARON, in English law, a court incident to every manor in the kingdom, to be holden by the steward within the said manor. This court-baron is of two natures: the one is a customary court, appertaining entirely to the copyholders, in which their estates are transferred by surrender and admittance, and other matters transacted relative to their tenures only. The other is a court of common law, and it is the court of the barons, by which name the freeholders were sometimes anciently called: for that it is held before the freeholders, who owe suit and service to the manor, the steward being rather the registrar than the judge. These courts, though in their nature distinct, are equally confounded together. The court we are now considering, viz. the freeholders court, was composed of the lord's tenants, who were the pares of each other, and were bound by their feodal tenure to assist their lord in the dispensation of domestic justice. This was formerly held every three weeks; and its most important business is to determine, by writ of right, all controversies relating to the right of lands within the manor. It may also hold plea of any personal actions, of debt, trespass on the case, or the like, where the debt or damages do not amount to 40*s*. or three marks, which is the same sum that bounded the jurisdiction of the ancient Gothic courts, in their lowest instance, or fierding courts, so called because four were instituted within every superior district or hundred. But the proceedings on a writ of right may be removed into the county-court by a precept from the sheriff called a tolt, quia tollit atque eximit, causam è curia baronum. And the proceedings in all other actions may

be removed into the superior courts by the king's writ of pone, or accedas ad curiam, according to the nature of the suit. After judgment given, a writ also of false judgment lies to the courts at Westminster to re-hear and review the cause, and not a writ of error; for this is not a court of record: and therefore, in some of these writs of removal, the first direction given is to cause the plaint to be recorded, recordari facias loquelam.

Court-martial, a court appointed for the punishing offences in officers, soldiers, and sailors, the powers of which are regulated by the mutiny-bill. For other courts, see Admiralty, Arches, Bench, County, Common-pleas, Chancery, Ecclesiastical, Duchy, &c. &c.

Court, denotes also further; 1. A small opening enclosed with houses, and paved with broad stones. 2. Persons who compose the retinue of a prince (*Temple*). 3. Persons who are assembled for the administration of justice. 4. Any jurisdiction, military, civil, or ecclesiastical (*Spec.*). 5. The art of pleasing; the art of insinuation; civility; flattery (*Locke*).

To Court. *v. a.* (from the noun). 1. To woo; to solicit a woman (*Ben Jonson*). 2. To solicit; to seek (*Locke*). 3. To flatter; to endeavour to please.

Court-chaplain. *s.* One who attends the king to celebrate the holy offices (*Swift*).

Court-day. *s.* Day on which justice is solemnly administered (*Arbuthnot*).

Court-dresser. *s.* A flatterer (*Locke*).

Court-favour. *s.* Favours or benefits bestowed by princes (*L'Estrange*).

Court-hand. *s.* The hand or manner of writing used in judicial proceedings (*Shaks.*).

Court-lady. *s.* A lady conversant or employed in court (*Locke*).

CO'URTEOUS. *a.* (*courtois*, Fr.) Elegant of manners; well bred (*South*).

CO'URTEOUSLY. *ad.* Respectfully; civilly; complaisantly (*Calamy*).

CO'URTEOUSNESS. *s.* (from *courteous.*) Civility; complaisance.

CO'URTESAN. Co'urtezan. *s.* (*corti-sana*, low Latin.) A woman of the town; a prostitute; a strumpet.

Lais, the famous Theban courtesan, stands on record for requiring no less than 10,000 crowns for a single night's cohabitation. How different is the reward of the iniquity of many thousands of modern prostitutes, who

> "—walk abroad, a nuisance where they go,
> And *snatch from infamy the bread of* woe!"

CO'URTESY. *s.* (*courtoisie*, French.) 1. Elegance of manners; civility; complaisance (*Clarendon*). 2. An act of civility or respect (*Bacon*). 3. The reverence made by women (*Dryden*). 4. A tenure, not of right, but by the favour of others; as, *to hold upon* courtesy. 5. Courtesy *of England.* A tenure by which, if a man marry an inheritrix, that is, a woman seised of land, and getteth a child of her that comes alive into the world, though both the child and his wife die forthwith, yet shall he keep the land during his life (*Cowell*).

To Co'urtesy. *v. n.* (from the noun.) 1. To perform an act of reverence (*Shakspeare*). 2. To make a reverence in the manner of ladies (*Prior*).

COU'RTIER. *s.* (from *court.*) 1. One that frequents or attends the courts of princes (*Dryden*). 2. One that courts or solicits the favour of another (*Suckling*).

CO'URTLIKE. *a.* (*court* and *like.*) Elegant; polite (*Camden*).

CO'URTLINESS. *s.* (from *courtly.*) Elegance of manners; complaisance; civility (*Digby*).

CO'URTLING. *s.* (from *court.*) A courtier; a retainer to a court (*Ben Jonson*).

CO'URTLY. *a.* (from *court.*) Relating or retaining to the court; elegant; soft; flattering (*Pope*).

Co'urtly. *ad.* In the manner of courts; elegantly.

COURTRAY, a town of the Netherlands, on the river Lis. Lat. 50. 50 N. Lon. 3. 6 E.

CO'URTSHIP. *s.* (from *court.*) 1. The act of soliciting favour (*Swift*). 2. The solicitation of a woman to marriage (*Addison*). 3. Civility; elegance of manners (*Donne*).

COUSIN, a term of relation between the children of brothers and sisters, who in the first generation are called cousin-germans, in the second generation second cousins, &c. If sprung from the relations of the father's side, they are denominated paternal cousins; if on the mother's, maternal. The word is ordinarily derived from *consanguineus*; though Menage takes it from *congenius*, or *congeneus*, q. d. *ex eodem genere.*

Cousin, is also a title given by the king to a nobleman, particularly to one of those of the council.

COUSU, in heraldry, signifies a piece of another colour or metal placed in the ordinary, as if it were sewed on, as the word imports. This is generally of colour upon colour, or metal upon metal, contrary to the general rule of heraldry.

COUSSINET, cushion, in architecture, the stone that crowns a piedroit, or pier; or that lies immediately over the capital of the impost.

COUTANCES, a seaport of France, in the department of the Channel, and late province of Normandy. This town was anciently called *Constantia*, or *Cosedia*. It now has a magnificent cathedral. Lat. 49. 3 N. Lon. 1. 23 E.

COUTHUTLAUGH. (from the Saxon *couth*, knowing, and *utlaugh*, outlaw.) He that wittingly receives a man outlawed, and cherishes or conceals him; for which offence he was in ancient times subject to the same punishment with the outlaw himself.

COUVRE-FEU. See Curfeu.

COW. *s.* (In the plural anciently *kine*, or *keen*, now commonly *cows*; cu, Sax. *koe*,

Dutch.) The female of the bull. See BONASUS.

COW AND CALF, rocks of Ireland, in the Dundrum Bay, near the south-east coast of the county of Down: four miles W. St. John's Point.

COW, or COWMULL, a river of Hindoostan, which runs into the Sind, thirty miles below Attock.

To COW. *v. a.* (from *coward.*) To depress with fear (*Howell*).

COW-BANE, in botany. See CICUTA.

COW-HERD. *s.* (*cow* and hynð, Sax. a keeper.) One whose occupation is to tend cows.

COW-HOUSE. *s.* (*cow* and *house.*) The house in which kine are kept (*Mortimer*).

COW-ITCH, or COUHAGE. See DOLICHOS.

COW-KEEPING, the practice of keeping cows.

The cows kept in the neighbourhood of London, to supply the metropolis with milk, are in Middlesex about 7290; in Surrey, 619; in Kent, 681; in all 8590.

COW-LEECH. *s.* (*cow* and *leech.*) One who professes to cure distempered cows.

To COW-LEECH. *v. n.* To profess to cure cows (*Mortimer*).

COW-PARSLEY. See CHŒROPHYLLUM.

COW-PARSNEP. See HERACLIUM.

COW'S LUNG-WORT. See VERBASCUM.

COW-WEED. See CHŒROPHYLLUM.

COW-WHEAT. See MELAMPYRUM.

COWARD (William), an English physician, born at Winchester about 1657. He took his degrees at Oxford, and then settled in London as a physician. In 1702 he printed a book entitled Second Thoughts on the Human Soul, in which he denied its immateriality. This work was attacked by several writers, and defended by the author. The house of commons interfered in the dispute, and ordered the doctor's books to be burned by the common hangman. In 1706 he published a treatise on vision, under the title of Ophthalmiatria. He died about 1725.

CO'WARD. *s.* (*couard*, French.) A poltroon; a wretch whose predominant passion is fear (*South*).

CO'WARDICE. *s.* (from *coward.*) Fear; habitual timidity; want of courage (*Rogers*).

CO'WARDLINESS. *s.* (from *cowardly.*) Timidity; cowardice.

CO'WARDLY. *a.* (from *coward.*) 1. Fearful; timorous; pusillanimous (*Bacon*). 2. Mean; befitting a coward (*Shakspeare*).

CO'WARDLY. *ad.* In the manner of a coward; meanly; vilely (*Knolles*).

COWBRIDGE, a town of South Wales, in the county of Glamorgan, with a weekly market on Tuesdays. The Easter quarter sessions for the county are held here. Lat. 51. 28 N. Lon. 3. 33 W.

COWELL (John), an English civilian, born in Devonshire about 1554, and brought up at Cambridge, of which university he was appointed king's professor of civil law, and master of Trinity hall. In 1607 he published his Interpreter, or an Explanation of Law Terms. This book has been several times reprinted; but the house of commons took offence at some passages in it, and ordered the book to be publicly burnt. He died in 1611. Dr. Cowell also wrote Institutes of the Laws of England, 1605 (*Watkins*).

To CO'WER. *v. n.* (*cwrrain*, Welsh.) To sink by bending the knees; to stoop; to shrink (*Milton. Dryden.*)

COWES, a town and harbour on the N. E. coast of the Isle of Wight. It is a place of good trade; and lies nine miles from Portsmouth, and ten from Southampton. Lat. 50. 46 N. Lon. 1. 15 W.

CO'WISH. *a.* (from *to cow.*) Timorous; fearful: not in use (*Shakspeare*).

COWL, or COUL, a sort of monkish habit worn by the Bernardines and Benedictines. The word is formed from *cucullus*, by confounding the two first syllables into one, as being the same twice uttered. There are two kinds of cowls: the one white, very large, worn in ceremony, and when they assist at the office; the other black, worn on ordinary occasions, in the streets, &c. F. Mabillon maintains the cowl to be the same thing in its origin with the scapular. The author of the Apology of the Emperor Henry IV. distinguishes two forms of cowls: the one is a gown reaching to the feet, having sleeves, and a capuchin, used in ceremonies; the other a kind of hood to work in, called also a *scapular*, because it only covers the head and shoulders.

COWL, is also a vessel in which water is carried on a pole between two.

COWL-STAFF. *s.* (*cowl* and *staff.*) The staff on which a vessel is supported between two men (*Suckling*).

COWLED or CUCULLATE LEAF, in botany. (*folium cucullatum.*) Wide at top, drawn to a point below, as in geranium cucullatum: in shape of the paper rolled up conically by grocers for small parcels of spices, comfits, &c.

> "Vel thuris piperisque sis cucullus."
> *Martial.*

Hence, as observed above, from a similitude in the form, this term was applied to the cowl, or large pendent cape of the upper garment, which turned up occasionally to cover the head.

> "Pullo Mævius alget in cucullo."
> *Martial.*

COWLEY (Abraham), an English poet, born in London in 1618, and educated at Westminster school. At the age of fifteen he published a small collection of poems, entitled Poetical Blossoms. From Westminster he removed to Trinity college, Cambridge, where he wrote several of his pieces. In 1643 he was ejected from the college for his loyalty, and then went to Oxford, where he was well received by the royalists. He afterwards went to France in the service of the earl of St. Alban's, and continued abroad ten years. In 1656 he came to England, and was soon

after seized and committed to prison, from whence he did not get out but with great difficulty. The next year he went to Oxford, and took his degree of M. D. On the death of Cromwell he returned to France; but when the king was restored, he came back and resolved to spend his days in retirement. He died at his house at Chertsey in 1667, and was buried in Westminster abbey. Besides his poems, he wrote some prose works, as a Discourse concerning the Government of Oliver Cromwell; and a Proposition for the Advancement of Experimental Philosophy.

The moral character of Cowley appears, from every account of it, to have been very excellent. "He is represented by Dr. Spratt (says Dr. Johnson) as the most amiable of mankind; and this posthumous praise may be safely credited, as it has never been contradicted by envy or by faction." As a poet, his merits have been variously estimated: Lord Clarendon has said he made a flight above all men; Addison, in his account of the English poets, that he improved upon the Theban bard; the duke of Buckingham, upon his tomb-stone, that he was the English Pindar, the Horace, the Virgil, the delight, the glory of his times. And with respect to the harshness of his numbers, the eloquent Spratt tells us, that if his verses in some places seem not so soft and flowing as one would have them, it was his *choice*, not his *fault*.

COWPER (William), an admirable English poet, was born at Berkhamstead in Hertfordshire, November 26, 1731. His family had been long distinguished both for talents and for virtues. Lord chancellor Cowper was one of his ancestors, at the distance of only three generations. His celebrity is well known to every intelligent lover of his country. The father of our poet held the living of Berkhamstead; and appears to have been a man of amiable manners and of strict integrity. The mother died at an early period; a circumstance which her son lamented in strains of affecting sensibility. Mr. Cowper, at the usual age, was sent to Westminster-school, where he made an astonishing progress in his classical studies. How long he continued in this famous seminary we know not, but certain it is, that the bustle of a public school was ill suited to the modesty and quietness of his disposition. Whether he was disgusted with the overbearing conduct of the elder scholars, or whether he thought such a situation injurious to moral improvement, we can scarcely say, except from the opinions expressed in his Tirocinium, or Review of Schools, where the latter seems the most forcibly struck at. In consequence, however, of this aversion, he never visited college, but in other ways supplied the defect of his education. When Mr. C. reached maturity, he was appointed clerk to the house of lords, having previously entered himself at the Temple, by way of preparation. This clerkship manifestly requires an occasional appearance before the upper house, a circumstance which proved an insurmountable objection to our young poet. Overpowered with the reflection, and about the same time losing a valued friend and a favourite mistress, he became extremely miserable. He relinquished his situation before he had entered upon any of its duties, and courted the shade of privacy. In his retirement the most sombrous hue was spread by his imagination over all his prospects. In one of his poems, after speaking of his mother and father as having arrived at the mansions of glory, he pours forth the following peculiarly affecting lines:

"But *me*, scarce hoping to attain that rest,
Always from port withheld, always distrest;
Me, howling winds drive devious, tempest toss'd,
Sails ripp'd, seams opening wide, and compass lost,
And day by day some current's thwarting force,
Sets me more distant from a prosperous course.
But oh! the thought that *thou* art blest, and *he*,
That thought is joy, arrive what may to me."

The reader, though he cannot fail of commiserating the condition of our poet, yet will be surprised to find that, amidst this singular distress, he not only applied to his literary studies with uncommon avidity, but actually composed most of those poems with which the public has been so greatly and justly delighted. Mr. C. at one time lived with Dr. Cotton (the ingenious author of Visions in Verse), at St. Albans; then resided with Mr. Unwin, a clergyman, at Huntingdon; and next took up his abode at Olney, where he formed an acquaintance with the late rev. John Newton. Here most of his poems were composed: the first volume was published by Mr. Newton about 1780, and the second volume, containing The Task, &c. two or three years after: both volumes have now gone through several editions. In the year 1779, Mr. Newton published a volume, entitled, Olney Hymns, among which the pieces with the signature C are Mr. Cowper's; they are written with great simplicity and pathos: in the words of a truly respectable critic, they "are the very language of the soul, but there is a soul in that language which communicates almost unutterable things." Mr. Cowper also produced a Translation of Homer in blank verse, in 2 vols. 4to. which does great credit to his judgment and ability, as well as his poetic taste. The merits of Pope's and of Cowper's Homer are distinct and appropriate: the former exhibited Homer as he would have sung, had he been born in England; the latter has attempted to pourtray him as he wrote in Greece. A new edition of Mr. Cowper's Homer has lately appeared in 4 vols. 8vo.

Our poet died on the 25th of April, 1800, at East Durham, near Norwich, where he had resided with a young friend and relative,

the rev. Dr. Johnson, some time previous to his dissolution. Mr. Greatheed, then of Newport Pagnel, preached his funeral sermon at Olney; in this sermon he details the rise and progress of Cowper's malady, with a minuteness, tenderness, and piety that will be gratifying to many of our readers. Mr. Hayley, also, has published a very interesting account of Cowper's life, including numerous letters from his inestimable correspondence, in 2 vols. 4to. An abridgement of this work, we believe by Mr. Greatheed, has been published in a neat pocket volume.

Two posthumous publications from the pen of Cowper have appeared: the first, translations from the French of madame Guion; the last, Latin and Italian Poems of Milton, translated into English verse, and a Fragment of a Commentary on Paradise Lost.

Many reflections naturally suggest themselves, on contemplating the extraordinary circumstances that marked the life of this excellent man: perhaps the reader will indulge us in a few. First, the affecting malady with which Cowper so long struggled has been again and again ascribed to the baneful influence of the peculiar religious sentiments he had adopted; without pretending to decide whether his opinions in this respect were correct or erroneous, we think it right to say, that Cowper's melancholy cannot, by any candid man, be ascribed primarily to his religious notions; nay farther, we are inclined to assert, that were it not for the consolations he at times derived from his belief in Christianity, his talents would have been in a great measure, if not entirely, lost to the world. Let us attend to the poet's own heart-rending account of the origin of his melancholy:

"Doom'd as I am in solitude to waste
The present moments, and regret the past;
Depriv'd of every joy I valued most,
My *friend torn from me, and my mistress lost*;
Call not this gloom I wear, this anxious mien,
The dull effect of humour or of spleen!
Still, still I mourn, with each returning day,
Him—snatch'd by fate in early youth away.
And her—thro' tedious years of doubt and pain,
Fix'd in her choice, and faithful—but in vain.
See me—ere yet my destin'd course half done
Cast forth a wand'rer on a wild unknown!
See me neglected on the world's rude coast,
Each dear companion of my voyage lost!
Nor ask why clouds of sorrow shade my brow,
And ready tears wait only leave to flow;
Why all that soothes a heart from anguish free,
All that delights the happy, palls with me."

That any man, under such pressures, should at first direct himself to those resources which religion only can afford, is perfectly rational: but the morbid melancholy, and susceptible mind of Cowper, struggled for years with his affliction, without comfort, but rather an aggravation of his pains. Yet this very mind, when put under the care of Dr. Cotton of St. Albans (a physician as capable of administering to the spiritual as to the natural maladies of his patients) received the first consolation it ev r tasted, and that from the truths peculiar to Christianity. It was under the care of this physician that Cowper first became distinctly acquainted with those sublime and animating truths which so distinguished and exalted his strains as a poet. Here also, as Mr. Cecil justly remarks, he received that settled tranquillity and peace which he enjoyed for several years afterwards. So far, therefore, was his constitutional malady from being produced or increased by his religious connections, either at St. Albans or at Olney, that he seems never to have had any settled peace, but from the doctrines he learned in those societies; and scarcely ever to be fit for literary occupations, but when the belief of those doctrines cheered his soul. Among his religious friends alone, "he found the only sunshine he ever enjoyed, through the cloudy day of his afflicted life."

We must now speak of the powers of Cowper as a poet. Although he spent the greater part of his life under the pressure of the sorest of human calamities, yet was his mind distinguished by its energy and activity. His genius was brilliant, and the resources of his imagination inexhaustible. From the first volume of his poems, which are on various subjects, it seems that he had been chiefly assiduous in cultivating a turn for grave and argumentative versification, on moral topics. If the reader will now and then consent to forego the delight of smooth versification (for it must be confessed that Cowper is not always harmonious), and recollect that poetry does not altogether consist in even and polished metre, he will remark in these productions no ordinary depth of thinking and of judgment, upon the most important objects of human concernment. Most of his lighter pieces are well known. In these we meet with many happy strokes of delicate wit, and poignant, though good-natured, satire: indeed, when Cowper took up the pen of the satirist, his object was not to gratify spleen, for he had none, but to promote the happiness and improvement of his fellow-creatures. His grand performance is the Task: though the occasion that gave birth to it was a trivial one. A lady had requested him to write a piece in blank verse, and gave him the *sofa* for his subject. This he expanded into one of the finest moral poems which the English language has produced. The construction of the verse is truly original and characteristic: it is not too stately for familiar description, nor too depressed for sublime and elevated imagery, though perhaps it is too much laden with idiomatic expression. In this poem his fancy ran with the most ex-

cursive freedom. The poet enlarges upon his topics, and confirms his argument by every variety of illustration. He never dwells upon them too long, but leaves off in such a manner as shews that it was in his power to have said more. The arguments of the poem are various: the works of Nature, the designs of Providence, and the passions of men. Of one advantage the writer has amply availed himself: the piece not being rigidly confined to any precise subject, he has indulged himself in all the freedom of a miscellaneous poem. Yet he has still adhered so faithfully to the general laws of congruity, that, whether he inspires the softer affections, or delights with keen and playful raillery, or descants on the rich beauties of creation, or discourses on the ordinary manners of human nature, or presents the bright prospects of religious consolation to the mind, he adopts at pleasure a diction generally just and appropriate.

Since Thomson, Cowper is the poet who has added most to the stock of natural imagery; and his paintings are more exact than those of that writer, though generally less grand and comprehensive. His manner, indeed, has led some of his imitators into a kind of Dutch style of painting, which has wasted the powers of description upon objects not worth the pains; but Cowper himself is generally preserved by good taste from this degradation of his art. The pious and moral reflections of the Task, touch the heart with irresistible force; and its delineations of character are life itself. The personifications, and allegorical figures interspersed, display high powers of fancy; and the picture of Winter riding on his sledgy car may vie in sublimity with any effort of poetical invention. The permanent colour of the diction is ease and force, sometimes deviating into negligence, but more free than perhaps any other blank verse from the stiffness and tumidity which so commonly disfigure this mode of writing.

Previous to the time of this author, our poets had become timid and fastidious, and circumscribed themselves both in the choice and the management of their subjects, by the observance of a limited number of models, who were thought to have exhausted all the legitimate resources of the art. Cowper was one of the first who stepped beyond this enchanted circle, who regained the natural liberty of invention, and walked abroad in the open field of observation as freely as those by whom it was originally trodden: he passed from the imitation of the poets, to the imitation of nature, he therefore looked at her with his own eyes, instead of gazing at her through the dim "spectacles of books," and then ventured boldly upon the representation of objects hitherto undescribed by any of his predecessors. We have dwelt thus long upon his character and his merits, because we esteem him as a genius of a sublimer order, of an order to which we conceive that of no English poet can be reckoned superior, except Shakspeare and Milton.

COWPER'S GLANDS, in anatomy (*Cowperi glandulæ*, named from Cowper, who first described them). Three large muciparous glands of the male, two of which are situated before the prostate gland under the accelerator muscles of the urine, and the third more forward, before the bulb of the urethra. They excrete a fluid, similar to that of the prostate gland, during the venereal orgasm.

COW-POX. See VACCINATION.

COWRING, in falconry, the quivering of young hawks, who shake their wings in sign of obedience to the old ones.

COWRY, in helminthology. See CYPRÆA.

CO'WSLIP. *s.* (cuꝛlippe, Saxon.) Paigle, a species of primrose. See PRIMULA.

CO'WSLIP (American). See DODECATHEON.

CO'WSLIP (Jerusalem). See PULMONARIA.

COWSLIP (Mountain.) See PULMONARIA.

CO'XA (Coxa). In anatomy. The ischium is sometimes so called, and sometimes the os cocygis.

CO'XCOMB. *s.* (from *cock's comb.*) 1. The top of the head (*Shakspeare*). 2. The comb resembling that of a cock, which licensed fools wore formerly in their caps (*Sh.*). 3. A fop; a superficial pretender to knowledge or accomplishments (*Pope*).

CO'XCOMB, in botany. See COCK'S COMB.

COXCO'MICAL. *a.* (from *coxcomb.*) Foppish; conceited: a low word (*Dennis*).

COY. *a.* (*coi*, French.) 1. Modest; decent (*Chaucer*). 2. Reserved; not accessible (*Waller*).

To COY. *v. n.* (from the adjective.) 1. To behave with reserve; to reject familiarity (*Rowe*). 2. To make difficulty (*Shakspeare*).

CO'YLY. *ad.* (from *coy.*) With reserve; with disinclination to familiarity (*Chapman*).

CO'YNESS. *s.* (from *coy.*) Reserve; unwillingness to become familiar (*Walton*).

COYPEL (Charles Antoine), a French painter of eminence, was born at Paris in 1694, and died there in 1752. He was painter to the duke of Orleans, who had a great regard for him, and was wont to treat him with all the familiarity of a friend. Coypel wrote some theatrical pieces of great merit; and he appears to have been not only an ingenious, but also a very able man.

COZ. *s.* A cant or familiar word, contracted from cousin (*Shakspeare*).

To COZ'EN. *v. a.* To cheat; to trick; to defraud (*Clarendon. Locke*).

CO'ZENAGE. *s.* (from *cozen.*) Fraud; deceit; trick; cheat (*Ben Jonson*).

CO'ZENER. *s.* (from *cozen.*) A cheater; a defrauder (*Shakspeare*).

CRAB. *s.* (cꝛabba, Saxon.) 1. A crustaceous fish. (See CANCER.) 2. A wild apple; the tree that bears a wild apple. (See PYRUS.) 3. A peevish morose person. 4. A wooden engine with three claws for launching of ships, &c. (See GIN.) 5. The sign in the zodiack. (See CANCER.)

CRAB. *a.* Used for any sour or degenerate fruit; as *a* crab *cherry, a* crab *plum.*

CRAB-LOUSE. See PEDICULUS.

CRAB'S-CLAWS. See CHELÆ CANCRORUM.

CRAB'S-EYES. See OCULI CANCRORUM.

CRA'BBED. *a.* (from *crab.*) 1. Peevish; morose; cynical; sour (*Spenser*). 2. Harsh; unpleasing (*Dryden*). 3. Difficult; perplexing (*Prior*).

CRA'BBEDLY. *ad.* Peevishly; morosely.

CRA'BBEDNESS. *s.* (from *crabbed.*) 1. Sourness of taste. 2. Sourness of countenance; asperity of manners. 3. Difficulty; perplexity.

CRA'BER. *s.* The water-rat (*Walton*).

CRABRO, in entomology. See VESPA.

CRACATOA, the southernmost of a cluster of islands lying in the entrance of the streights of Sunda, in the East Indies. Lat. 8. 6 S. Lon. 105. 36 E.

CRACCA, in botany. See VICIA.

CRACK. *s.* (*craeck*, Dutch.) 1. A sudden disruption. 2. The chink or fissure made by disruption; a narrow breach (*Newton*). 3. The sound of any body bursting or falling (*Dryden*). 4. Any sudden and quick sound (*Addison*). 5. Change of the voice in puberty (*Shakspeare*). 6. Breach of chastity (*Shakspeare*). 7. Craziness of intellect. 8. A man crazed (*Addison*). 9. A whore, in low language. 10. A boast (*Spenser*). 11. A boaster, in low phrase.

To CRACK. *v. a.* (*craecken*, Dutch.) 1. To break into chinks (*Mortimer*). 2. To break; to split (*Donne*). 3. To do any thing with quickness or smartness (*Pope*). 4. To break or destroy any thing (*Shaksp.*). 5. To craze; to weaken the intellect (*Rosc.*)

To CRACK. *v. n.* 1. To burst; to open in chinks (*Boyle*). 2. To fall to ruin (*Dryden*). 3. To utter a loud and sudden sound (*Shak.*). 4. To boast (*Shakspeare*).

CRACK-BRAINED. *a.* Crazy; wanting right reason (*Arbuthnot*).

CRACK-HEMP. *s.* A wretch fated to the gallows (*Shakspeare*)

CRACK-ROPE. *s.* A fellow that deserves hanging.

CRA'CKER. *s.* (from the verb.) 1. A noisy boasting fellow (*Shakspeare*). 2. A quantity of gunpowder confined so as to burst with great noise (*Boyle*).

To CRA'CKLE. *v. n.* (from *crack.*) To make slight cracks; to decrepitate (*Donne*).

CRA'CKNELL. *s.* (from *crack.*) A hard brittle cake (*Spenser*).

CRACOW, the capital of Poland, seated in a palatinate of the same name; it has two large suburbs, and is surrounded with deep ditches and thick walls, and fortified with towers. Here is a famous university consisting of eleven colleges. War, famine, the plague, and a fire, made great havoc among the inhabitants all at the same time, insomuch that half of them were destroyed. It is 130 miles S.S.W. of Warsaw. Lat. 50. 10 N. Lon. 19. 55 E. This is the ancient Carrodunum.

CRA'DLE. *s.* (cnadel, Saxon.) 1. A moveable bed, on which children or sick persons are agitated with a smooth and equal motion (*Pope*). 2. Infancy, or the first part of life (*Claren.*). 3. (With surgeons.) A case for a broken bone. 4. (With shipwrights.) A frame of timber raised along the outside of a ship by the bulge.

To CRADLE. *v. a.* To lay in a cradle (*Arb.*).

CRADLE-CLOTHES. *s.* Bedclothes belonging to a cradle (*Shakspeare*).

CRAFT. *s.* (cræft, Saxon.) 1. Manual art; trade (*Wotton*). 2. Art; ability; dexterity (*B. Jonson*). 3. Fraud; cunning; artifice (*Shakspeare*). 4. Small sailing vessels.

To CRAFT. *v. n.* (from the noun.) To play tricks: out of use (*Shakspeare*).

CRA'FTILY. *ad.* (from *crafty.*) Cunningly; artfully (*Knolles*).

CRA'FTINESS. *s.* (from *crafty.*) Cunning; stratagem (*Job*).

CRA'FTSMAN. *s.* (*craft* and *man.*) An artificer; a manufacturer (*Decay of Piety*).

CRA'FTSMASTER. *s.* (*craft* and *master.*) A man skilled in his trade (*Collier*)

CRA'FTY. *a.* (from *craft.*) Cunning; artful; fraudulent; sly (*Davies*).

CRAG. *s.* 1. A rough steep rock (*Gibson*). 2. The rugged protuberance of rocks (*Fairf.*). 3. The neck (*Spenser*).

CRA'GGED. *a.* (from *crag.*) Full of inequalities and prominences (*Crashaw*).

CRA'GGEDNESS. *s.* (from *cragged.*) Fulness of crags or prominent rocks (*Brerew.*).

CRA'GGINESS. *s.* (from *craggy.*) The state of being craggy.

CRA'GGY. *a.* (from *crag.*) Rugged; full of prominences; rough (*Raleigh*).

CRAIG (John), a very respectable Scotch mathematician. We have not been able to ascertain the times of his birth and death, or with certainty his situation, though we believe he was minister to a congregation at Gillingham, as his communications to the Royal Society were dated from that place. He wrote a very singular work, entitled, Theologiæ Christiana principia Mathematica, which was printed at London in 1699, and reprinted at Leipsic in 1755. In this tract he maintains by mathematical calculation that Christianity will last only 1454 years from the date of his writing.

Besides his numerous papers in the London Philosophical Transactions, and the work abovementioned, he published Methodus Figurarum Quadratus, &c. An. 1685: De Quadraturis et Locis, 1693: De Calculo Fluentium, 1718. Mr. Craig is well known by his general and commodious formulæ for the construction of local equations of the third and fourth degrees. His treatise De Curvarum Quadraturis contains many ingenious inventions, and especially some very general series which, by the comparison of the coefficients of those series, with the exponents of the equation of the proposed curve, will immediately give the area in finite terms, when that is possible. This method he farther pursued

and improved in his treatise De Calculo Fluentium.

CRAIL, a borough in Fifeshire, seated at the mouth of the Frith of Forth. Lat. 56. 15 N. Lon. 2. 36 W.

CRAKE, in ornithology. See RALLUS and STURNUS.

CRAKE-BERRY, in botany. See EMPETRUM.

To CRAM. *v. a.* (cꞃamman, Saxon.) 1. To stuff; to fill with more than can conveniently be held (*Shakspeare*). 2. To fill with food beyond satiety (*King*). 3. To thrust in by force (*Dryden*).

To CRAM. *v. n.* To eat beyond satiety *Pope*).

CRA'MBE, sea-kale, sea-colewort, sea-beach, sea-cabbage, a genus of the class tetradynamia, order siliculosa. Silicle globular, deciduous, without valves, one-seeded: the four longer filaments with a tooth near the top. Eight species, scattered over the globe; of which, one, c. mauritima, is indigenous to the coasts of our own country, and is cultivated in our gardens generally as a useful culinary, but at times for its beauty. The seeds should be sown in common earth in either spring or autumn, where the plants are to remain; at the age of two years it produces shoots fit for use, and multiplies exceedingly by the roots, which it will continue to do for several years.

CRA'MBO. *s.* a play at which one gives a word, to which another finds a rhyme (*Swift*).

CRAMER (Gabriel), a mathematician of Geneva, born in 1694. He became professor of mathematics, and a member of most of the learned societies in Europe. He died in 1752. He wrote some ingenious original pieces, among which the principal is entitled, Introduction a l'analyse des lignes courbes algébriques, in 4to, which was published at Geneva in 1750. This work is equally deserving of recommendation for the profoundness of its doctrine, and the perspicuity of its developements. Cramer also edited the works of John and James Bernoulli.

CRAMP. (*crampus, krampe*; from *krimpen*, to contract. Germ. This word was first used by Van Helmont). A spasm of a muscle or muscles. See CONTRACTION.

CRAMP, signifies also a restriction, or confinement.

CRAMP-IRON, or CRAMP, a piece of iron bent at each end, which serves to fasten together pieces of wood, stones, &c.

CRAMP. *a.* Difficult; knotty: a low term.

To CRAMP. *v. a.* (from the noun.) 1. To pain with cramps or twitches (*Dryden*). 2. To restrain; to confine; to obstruct; to hinder (*Granville. Burnet*). 3. To bind with cramp-irons.

CRA'MPFISH. *s.* The torpedo, which benumbs the hands of those that touch it. See RAJA and TORPEDO.

CRA'NAGE. *s.* (*cranagium*, low Lat.) A liberty to use a crane; also the money taken and paid for the same (*Cowell*).

CRANBERRY, in botany. See VACCINIUM.

CRANBOURN, a town of Dorsetshire, with a market on Wednesdays. It was a place of great note in the Saxon and Norman times, and is the birth-place of bishop Stillingfleet. Lat. 50. 54 N. Lon. 1. 51 W.

CRANBROOK, a town in Kent, with a market on Saturdays. Lat. 51. 4 N. Lon. 0. 39 E.

CRANE, in astronomy. See GRUS.

CRANE, in hydraulics, a popular name for a SYPHON, which see.

CRANE, in mechanics, a machine used in building, on wharfs and in warehouses, for raising and lowering huge stones, ponderous weights, packages, &c.

Cranes, until of late years, were commonly constructed as follows: The principal member is a strong upright beam or arbor, firmly fixed in the ground, and sustained by eight arms, coming from the extremities of four pieces of wood laid across, through the middle of which passes the foot of the beam. About the middle of the arbor the arms meet, and are mortised into it; its top ends in an iron pivot, on which is borne a transverse piece, advancing out to a good distance, something after the manner of a crane's neck, whence the machine has its name. This projecting piece is now more commonly called the jib or gibbet. The middle and extremities of this are again sustained by arms from the middle of the arbor: and over it comes a rope or cable, to one end of which the weight is fixed; the other is wound about the spindle of a wheel, which when turned (commonly by means of men walking upon the inside of the rim of the wheel) draws the rope, and that heaves up the weight; which may afterwards be applied to any side or quarter by the mobility of the transverse piece on the pivot. These cranes have usually been made of two kinds: in the first, called the rat-tailed crane, the whole machine with the load turns upon a strong axis; in the second kind the gibbet alone moves on its axis. But in either kind, if the machinery is put into motion by men walking within the wheel, as has been till lately the almost universal practice in this country, the labourers employed are exposed to extreme danger, and have frequently met with the most shocking and fatal accidents. It is not then to be wondered at, that skilful mechanists should at length have devised cranes that are not only more safe, but more powerful in their operation, than the common walking crane.

The late Mr. Ferguson invented a crane which has three trundles, with different numbers of staves, that may be applied to the cogs of a horizontal wheel with an upright axle; round which is coiled the rope that draws up the weight. This wheel has 96 cogs; the

larges trundle 24 staves, the next 12, and the smallest 6; so that the largest revolves 4 times for one revolution of the wheel, the next 8, and the smallest 16. A winch is occasionally fixed on the axis of either of these trundles for turning it; and is applied to the one or the other according as the weight to be raised is smaller or larger. While this is drawing up, the ratch-teeth of a wheel slip round below a catch that falls into them, prevents the crane from turning backwards, and detains the weight in any part of its ascent, if the man who works at the winch should accidentally quit his hold, or wish to rest himself before the weight is completely raised. Making a due allowance for friction, a man may raise by such a crane, from three times to twelve times as much in weight as would balance his effort at the winch, viz. from 90 to 360 lbs. taking the average labour.

Fig. 1. Pl. 51, is a simple and effective crane at a wharf on the banks of the Thames, between Greenwich and Woolwich. A B C are three upright posts connected at the top by a triangular frame, across the middle of which is a beam D, between this and a block on the ground the jib plays: on each side of the upright shaft E, two bars F G are bolted, spreading out as they recede from it to receive the wheel H; I I are braces to support the bars. At that part where the braces are bolted to the upright, an horizontal frame K is fixed for carrying the roll and winch: the rope which winds round this goes over the pulley L, and round the large wheel H. The rope which lifts the goods winds on each end of the axle of this wheel: and the middle of it passes through a pulley-block O, to which the goods are hooked. Cranes nearly as simple as this, and with only a slight modification in the construction, are often erected on the banks of canals in different parts of the country.

Fig. 2. is an elevation of a crane at Queenhithe wharf, London. A B is a very strong upright beam, firmly bolted to beams running inland, and further secured by curved stays D; *a d e* is a cast-iron frame, bolted to the beam at one end, and the stays D at the other. This forms the frame for the wheelwork, which is the same as fig. 1; the chain, after going round the roll, goes over a large wheel *f*, and passes through the beam to the jib. E is a cast-iron frame, bolted to the top of the beam A B; to receive the upper pivot of the jib *g* is one of the small pulleys, round which the chain bends when the jib is turned overland to raise or lower goods. F is another cast-iron frame, to support the lower pivot of the jib, and G is a pile bolted to it to assist. A few boards nailed over the two stays D form a cover for the whole machinery, and defend the wheel-work. The jib and its iron-work will be understood by inspection of the figure. All cranes where chains are used for hoisting the goods should have barrels, with a spiral groove cut in them, and the lower half of the chain in the groove, as in fig. 3. This was applied, in 1789, by Mr. John Smeaton to a crane designed by him, and executed at the Wool-quay Custom-house, and found to be a great advantage. In 1805 Mr. Gilbert Gilpin received the silver medal of the Society of Arts for the same invention; the society appearing ignorant that it had been used before. The pulleys should also be grooved to receive the lower half of the alternate links of the chain in the same manner. Mr. Gilpin farther proposes, that the lower pivot on which the vertical arbor of the crane turns, instead of being fixed to that shaft, and turning in a bush or socket fastened in the nether block, shall be fixed in that block, while a socket in the lower part of the shaft shall be made to fit it and turn about it.

Figs. 4 and 5 represent the elevation and plan of a moveable crane erected by Mr. Keir at Ramsgate, in 1802. This admits of a motion from one place to another, by means of the wheel-carriage A B, to which the whole frame-work is fitted; while it also admits of a rotatory motion in a horizontal plane about the vertical shaft D F. The platform E is for the reception of the men who turn the wheel-work of the crane. The minutiæ of the construction will be sufficiently obvious from the figures.

We cannot terminate this article without noticing another crane invented by Mr. David Hardie, of St. James's-street, as we shink it on the whole preferable to any that has yet been proposed.

This crane is in fact a walking-wheel, on the principle of the wheel used in China for men working at the chain-pump, in raising water to the higher grounds employed in the culture of rice. The wheel is six feet in diameter, and may vary in length from six to twelve or more feet, according to the number of men intended to be employed in working it; on the outside of the wheel are placed twenty-four equidistant steps, after the manner of float-boards in a mill water-wheel; these are for the men to tread upon, where the steps are found at a height rather exceeding that of the axis, or just above the position where the plane of the steps becomes horizontal. At one end of the wheel, and upon its axle, is the crane-rope barrel, of a diameter suited to the draft of goods and the number of men generally allowed. The men ascend by a flight of steps to a platform on the same horizontal plane as the axle of the wheel, and which reaches to within a few inches of its rim; on this platform is a seat on which the men may rest themselves at the intervals between the operations. On the general frame-work which supports the wheel, there are placed above it, at suitable distances and convenient heights, both vertical and horizontal handles for the men to take hold of with both hands, when treading on the steps; sometimes both hands are applied to the vertical handles; at others, one hand to a vertical and the other

Fig. 1.

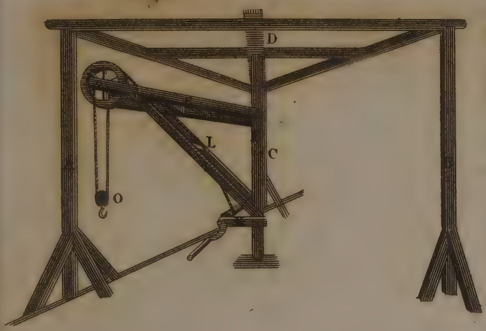


Fig. 2.

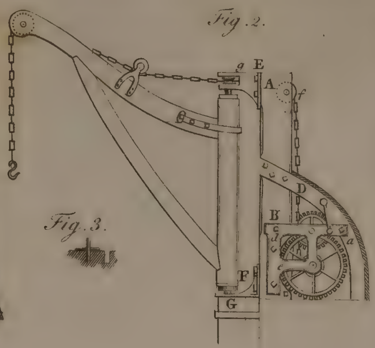
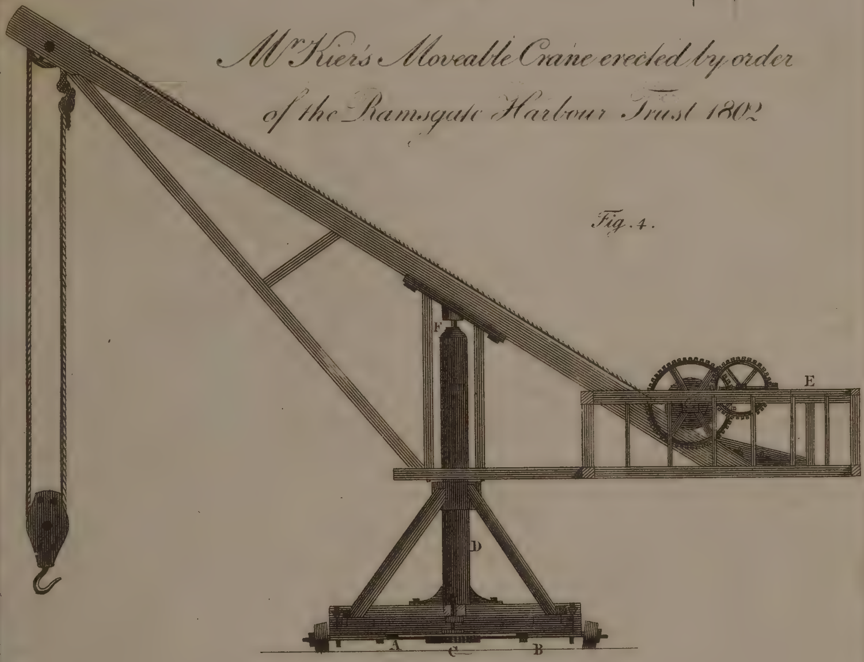


Fig. 3.

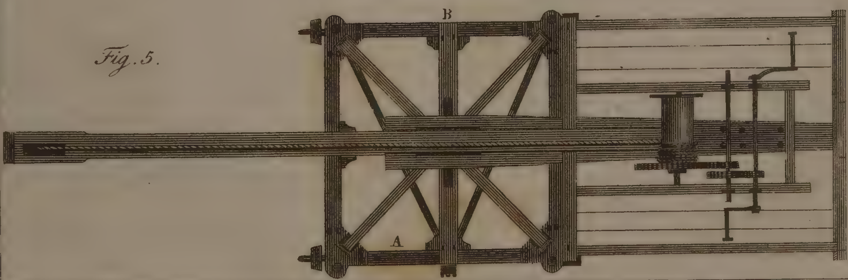
Mr. Kier's Moveable Crane erected by order of the Ramsgate Harbour Trust 1802

Fig. 4.



Plan of the Crane

Fig. 5.



Mutlow sc Russell Ct.

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to a horizontal handle; and at others, both hands to the horizontal handles; thus producing by either pushing or lifting, or both, a variety in the action, and when necessary, a considerable augmentation to the force. There is a pawl which drops in at every step to prevent the wheel and its incumbent weight from overpowering the men at any time; it has at its lower part a cord with a loop to pass over one of the horizontal handles, near the extremity of which there is a notch sufficiently deep to retain the loop when drawn into it, for the purpose of raising the pawl to disengage it from the wheel preparatory to any operation of lowering.

Now it is obvious, that by treading on the steps as they arrive at the position just above the horizontal plane passing through the axis, the men both ascend and descend nearly in the same vertical direction, of consequence the greatest possible velocity is produced without any unproductive labour; and the men are enabled to maintain the action by means of a hold of an upright handle in each hand, or occasionally to augment the action by pushing at these handles. Further, by taking hold of the horizontal handles, each man can, by an act similar to that of lifting, augment the force arising from his weight through all the degrees from about 150 to 300lbs.; so that the same number of men can perform many operations of raising greater drafts than usual: such as with the common walking-wheel or most other cranes could not be accomplished without additional men; and the pawl which drops in each step provides in the most effectual manner for the safety of the men; besides, that the distance between the edge of the platform and the revolving wheel is by no means large enough for a man to fall through.

Mr. Hardie has likewise contrived a method of operating without a gibbet, in which he places the crane at the top of the warehouse so as to allow the crane-rope to drop directly down from the barrel of the crane in front of the loop-holes; and at the upper floors, where the shortness of the rope diminishes the swing of the goods in or out of the loop-hole, he has provided a sliding floor immediately under the floor of the warehouse, which one man draws out or in, by pulling a cord, with the greatest ease, to receive or deliver the goods by a truck at the loop-hole. The part of the warehouse-floor which is immediately above the sliding-floor consists of a thin plate of cast-iron, which allows the truck to run off the one on the other, without any sensible obstruction. Thus more than one man's labour in five or six is saved by getting quit of the friction of the pulley of a gibbet; and a still greater saving of labour is effected by accelerating all the movements at the loop-holes.

Mr. Hardie's lowering regulator is invented for the special purpose of removing the evils and dangers attendant upon the usual practice of lowering goods by the brake and brake-wheel. The part essential to this invention is a cast-iron box fixed firmly to a floor, and divided into two cylindrical compartments; each 10 inches long, one of 4 inches diameter, and the other of two inches diameter: these are both filled with oil, a liquid not subject to any material change by frost; or they may be filled with water in summer and mild weather, and some spirituous liquor (gin for instance) in frosty weather. These two cylinders communicate by apertures at their top and bottom; the smaller compartment having a cock with its axle passing through the side of the iron box, guarded by a stuffing-box, and a quadrant with equidistant notches fixed at its end, to receive an iron claw which retains the cock in any proposed situation, and shews the extent of its apertures when opened. The larger compartment has a piston with its rod passing through the top of the iron box (guarded here also by a stuffing-box), and passing through a guide; this rod is connected with a joint moved by a crank, which is turned by a pinion of about six teeth, and this pinion is moved by a wheel of a size suited to the diameter of the barrel of the crane, and the weight of the goods commonly lowered: this latter wheel is fixed to the axle of the crane by a simple mode of connexion, which admits of its being disengaged during the operation of raising; it is also provided with the barrel-rope and counter-weight, which are commonly used for the purpose of winding up the slack crane-rope on the barrel of the crane, to be ready to repeat the operation of lowering.

Now if the cock were quite shut, the oil or other liquid confined between it and the piston would prevent the piston from moving, and of course hinder the goods hanging from the wheel, &c. connected with the pinion from descending: but, if the cock were opened a very little, the oil would pass slowly through it, and would therefore allow the piston to move up and down slowly, and the goods to descend slowly also: and in like manner a farther opening of the cock will permit the load to descend with a greater velocity: thus the cock, by being more or less opened, gives the precise velocity desired to the descent of the goods, whatever their weight may be.

The preceding description, although given without any figures, will, we trust, enable the reader to understand the nature of Mr. Hardie's inventions. The chief advantages resulting from them are too obvious to require our dwelling long upon them. Although the crane is a walking-crane, yet it is free from the dangers and disadvantages of the common walking-wheel; for as the men walk on the outside of the wheel instead of inside of the rim, they are, in consequence of the adjoining platform, and the use of the pawl, free from danger; while, during the whole time of their labour, they can walk in an upright posture, well suited to free respiration; and farther, as they act at the extremities of horizontal levers, their weight and occasional muscular force act

when all the advantage they can have; while the modifications they can make at pleasure in their action, will frequently supersede the necessity of calling in any more men, even when a double load is to be raised. Indeed, there can be no doubt that with a crane of this construction, any given number of men will raise at least twice as much in a day, as they could in a common walking-wheel, or working at a capstan, or at a wheel and pinion. And as to the lowering apparatus, it possesses a much higher degree of perfection in lowering than any of the other cranes. The means afforded of regulating it to lower either small or great weights with facility, expedition, and safety, and without depending during the operation on the precarious attention and management of a man, render it in our opinion far preferable to the hazardous and limited mode of lowering goods by the brake: while, with respect both to safety and great saving of labour, it obviously surpasses the modes of lowering by the capstan and the walking-wheel, which require nearly the same number of men to lower that they take to raise any weight.

Mr. Hardie has secured to himself this invention by a patent dated March, 1799. A description of both crane and regulator, illustrated by a plate, is given in the 2d vol. of Gregory's Mechanics; where also are described the cranes of Gottlieb, Andrews, Hall, Whyte, &c. Mr. Hardie's specification is given at length in Rep. of Arts, No. 53, new series.

CRANE. In ornithology. See ARDEA.

CRANE'S-BILL. In botany. See ERODIUM.

CRANE-FLY. In entomology. See TIPULA.

CRANGANORE, a town and fort of Hindoostan, on the coast of Malabar. Lat. 10. 23 N. Lon. 76. 30 E.

CRANICHIS. In botany, a genus of the class gynandria, order diandria. Pectary vaulted, ovate, gibbous, slightly carinate, entire at the tip. Five species, all natives of Jamaica.

CRANIOLARY. See MARTYNIA and GESNERIA.

CRANIOGNOMY. CRANIOLOGY. CRANIOSCOPY. (from κρανιον, the scull; and γνωμων, an index; λογος, a treatise; and σκοπος, scope or intention.) A visionary system of physiognomy, lately brought forwards by Dr. Gall of Vienna, to which each of these names has been indiscriminately applied by the inventor, or his scholars. The enthusiasm with which this system was at first received and prosecuted by persons of all ranks and professions throughout Germany, has scarcely ever been equalled. Even Rantism itself was, for a period, absorbed in the vast vortex of Gallism, and almost every scholar thought it as necessary to be acquainted with the principles of the latter as with the rudiments of his native tongue. The rage, however, has for some time subsided, and craniognomy, or Gallism, is now reduced to its proper level, offering to the student a series of plausible propositions, combining some portion of fact with a much larger portion of fancy, and made subservient by the author of the theory to the most extravagant and dangerous results: far exceeding any thing that ever sprouted from the hot-house productions of Porta, Lavater, or the inventor of the doctrine of the facial angle.

The chief principles on which this system is pretended to be founded are the following:

I. The brain is the material organ of the internal faculties.

II. The brain contains different organs for different faculties, every organ independent of each other.

III. The developement of the organs contained in the cranium is in direct proportion with the force of their corresponding faculties.

IV. We may judge of these different organs and their faculties by the exterior form of the cranium; or, in other words, the formation of the cranium depends on the portion and prominencies of the brain, producing corresponding impressions and indentations.

Guided by these principles, Gall pretended to examine nature; he compared the craniums of men and animals, and those of men of similar and of different faculties. His researches were designed to prove not only the preceding positions, but that the faculties of animals are similar to those of man; that what we call instinct in animals is also found in man; for example, love, cunning, circumspection, courage, &c.; that the quantity of organs is the standard which fixes the generic difference of animals; their mutual proportion, that of the individuals; that the disposition to any faculty which is originally given by nature, may be developed by exercise and favourable circumstances, and sometimes by disorders; but that it can never be created if not given by nature; that the accumulation of organs is constantly made from back to front, and from below upwards, so that animals in proportion as they resemble man in the quantity of their faculties, have the superior and anterior part of the cranium more developed; and lastly, that in man, the most perfect of animals, there are organs in the superior and anterior parts of the frontal and parietal bones assigned to faculties which exclusively belong to him.

The object of this theory, therefore, was to assign distinct compartments in the brain to the different sentient organs; which in all animals were said to be placed alike, and to produce wherever they exist the same necessary instincts or sensations. Thus, in one part of the brain he pretended to trace the organ of tenacity of life, viz. in the medulla oblongata; in a second, the organ of instinct for self-preservation, which he seated a little forwarder than the medulla oblongata; in a third, the organ determining the choice of food, situate in the quadrijumal tubercles; in a fourth, the organs of the external senses, occupying the middle part of the base of the brain, whence issue

the different nerves distributed to the different organs of external sensation; in a fifth, the organ of the instinct of sexual union, situate, as he pretended, at the base of the occiput behind the medulla oblongata, and the large aperture of the occiput, producing in the occiput a very unusual projection; in a sixth, the organ of the mutual love of parents and children, occupying all the back and upper part of the occiput; in a seventh, the organ of friendship; in an eighth, of courage; and in this manner he undertook to divide the whole of the interior of the cranium into thirty-three chambers, each when occupied by an organ of a more active power than the rest, and constituting the leading passion, betraying itself externally by a peculiar prominence or other mark in the cranium, by which the master of the system pretended to be able to determine the predominant passion at first sight. The passions or organs to which other chambers were allotted were those of the instinct of assassination, of cunning, circumspection, self-elevation, love of glory, love of truth, sense of locality, sense of things (general memory), sense of colours (painting), sense of numbers, musical sense, sense for mechanics, verbal memory, sense for languages, memory of persons, liberality, talent for satire, power of comparing things, metaphysical talent, talent for observation, goodness, theatrical talent, theosophy, perseverance: while to complete the thirty-three, and to leave convenient room for addenda, he pretended there were two chambers filled with organs whose uses he had not ascertained; these lie near the chamber of the organ of assassination, and correspond with the temporal bones.

"The organ of theosophy," says his disciple Dr. Bojames, "occupies the most elevated part of the os frontis. All the portraits of saints which have been preserved from former ages afford very instructive examples, and if this character is wanting in any one of them, it will certainly be destitute of expression. It is excessively developed in religious fanatics, and in men who have become recluse through superstition and religious motions.

"It is the seat of this organ, which, according to Gall, has determined men to consider their gods as above them in a more elevated part of the heavens. In fact, when we consider this subject philosophically, there is no more reason for supposing that God is placed above the world, than there is to suppose him below it."

It should hence appear, that sober piety and fanaticism are the same thing in the estimation of Dr. Gall and his disciples: that paganism, christianity, and mohamedanism depend upon the same physical principle. Why is no chamber allotted to hypocrisy or folly?

CRA'NIUM. (*cranium*, κρανιον, *quasi* καρανιον; from καρα, the head.) The skull, or superior part of the head. See CAPUT.

CRANK, a contrivance in machines, in manner of an elbow, only of a square form, projecting from a spindle, and serving by its rotation to raise and fall the pistons of engines. Mr. Ridley has a substitute for a crank in communicating motion to a foot lathe: for the description of which see Repertory of Arts, vol. viii. pa. 395.

CRANK likewise denotes the iron support for a lantern, or the like; also the iron made fast to a stock of a bell for ringing it.

In the sea-language, a ship is said to be crank-sided when she can bear but small sail, for fear of over-setting; and when a ship cannot be brought on the ground without danger, she is said to be crank by the ground.

CRANK signifies farther, 1. Any bending or winding passage (*Shakspeare*). 2. Any conceit formed by twisting or changing the form or meaning of a word (*Milton*).

CRANK. *a.* 1. Healthy; sprightly: not in use (*Spenser*). 2. Among sailors, a ship is said to be *crank* when loaded near to be overset.

To CRA'NKLE. *v. n.* (from *crank.*) To run in and out (*Shakspeare*).

To CRA'NKLE. *v. a.* To break into unequal surfaces (*Philips*).

CRA'NKLES. *s.* (from the verb) Inequalities; angular prominences.

CRA'NKNESS. *s.* (from *crank.*) 1. Health; vigour. 2. Disposition to overset.

CRANMER (Thomas), the first protestant archbishop of Canterbury. He was born at Aslacton, in Nottinghamshire, 1489, and educated at Jesus college, Cambridge, where he proceeded to the degree of D.D. The opinion which he gave on the question of Henry VIIIth's divorce recommended him to that monarch, who employed him to vindicate the measure, and sent him to the foreign universities to obtain their opinion upon the point. While he was at Rome he presented his book on the divorce to the pope, and offered to defend it against any learned man his holiness should appoint, but no one would enter the lists with him. In Germany he married a second wife, his first having been dead for some time. In 1532 he was raised to the see of Canterbury, and the year following he pronounced the sentence of divorce between the king and queen Catherine, and soon after married Henry to Anne Boleyn. He now set about the reformation with great earnestness, and procured an order for a translation of the Bible into English, and for its being publicly read in churches. In 1539 he incurred Henry's displeasure for not consenting to the alienation of the monastic lands to the king's sole use. Cranmer's design was to appropriate the revenues to the advancement of learning and religion. In 1545, his enemies brought forward several charges of heresy against him in the house of commons and the privy council, and it was expected that he would have been sent to the Tower, but Henry, who had a great love for him, interposed his authority, and saved him. On the death of that prince he was one of the regents of the kingdom, and one of the executors of his will. The reformation now went on with great vigour, and the archbishop had a considerable hand in composing

the homilies. The liturgy also was amended, and some new forms adopted. When queen Mary came to the throne, it was not to be expected that Cranmer should escape. He was committed to the Tower the same year, and in April 1554, sent down to Oxford with Ridley and Latimer, to engage in a public disputation with the popish divines. This mockery being over, he was tried and condemned for heresy, incontinency, and blasphemy. While in prison he was prevailed upon, by false promises of pardon, to sign his abjuration. Notwithstanding this, an order came down to commit him to the flames. On the day appointed for the archbishop to make a public recantation, he appeared at St. Mary's church, and to the surprise and mortification of his persecutors, he solemnly and pathetically professed his repentance of the error he had committed, and persisted nobly in defending the protestant faith which he had endeavoured to establish. The popish party, enraged, hurried him away to the stake opposite Baliol college, where he endured the flames with all the gracious simplicity and fortitude of a Christian martyr; holding out his right hand into the flame that it might be first consumed, often saying, "This unworthy hand!" His last words were, "Lord Jesus, receive my spirit!" Thus fell, in 1555, Thomas Cranmer, the great pillar of the English reformation. He was a man of mild disposition, and humble deportment, active in good works, and extensively learned. He wrote several religious tracts, and a number of letters and collections, which are in the king's and Cotton libraries. (*Watkins*).

The character of the archbishop hath been equally the subject of exaggerated praise and of undeserved censure. The most indefensible parts are the readiness with which he sometimes concurred in the unjustifiable proceedings of Henry VIII. and the instances wherein he shewed himself to be actuated by intolerant principles. One of the most honourable transactions of archbishop Cranmer's life, was the firm stand that he made against the act of the six articles. This act was so strongly supported by the king, that even the protestants in parliament made little opposition to it. But Cranmer opposed it with great zeal and steadiness. His behaviour in the cause of the duke of Norfolk was also entitled to great commendation. He was indeed remarkable for the placability of his temper, and for showing kindness to those by whom he had been greatly injured. Hence it is mentioned in Shakspeare's Henry VIII. as a common saying concerning him:

> ———"Do my lord of Canterbury
> But one shrewd turn, and he's your friend
> for ever."

Archbishop Cranmer was a great friend and patron of learned foreigners, who had been persecuted for their attachment to the principles of the Reformation. Mr. Gilpin says, "the suffering professors of protestantism, who were scattered in great numbers about the various countries of Europe, were always sure of an asylum with him. His palace at Lambeth might be called a seminary of learned men; the greater part of whom persecution had driven from home. Here, among other celebrated reformers, Martyr, Bucer, Aless, Phage, found sanctuary. Martyr, Bucer, and Phage, were liberally pensioned by the archbishop till he could otherwise provide for them."

CRA'NNIED. *a.* (from *cranny*.) Full of chinks (*Brown*).

CRA'NNY. *s.* (*cren*, French; *crena*, Lat.) A chink; a cleft; a fissure (*Burnet*).

CRANTARA, among the ancient Britons, was a sort of military signal used for collecting the distant and scattered warriors to the standard of their chief. A prince having immediate occasion for the assistance of his followers to repel some sudden invasion, or engage in some expedition, besides striking the shield and sounding the horn to give warning to those who were within hearing, he sent the crantara, or a stick burnt at the end and dipped in the blood of a goat, by a swift messenger, to the nearest hamlet, where he delivered it without saying a word but the name of the place of rendezvous. This crantara, which was well understood to denounce destruction by fire and sword to all who did not obey this summons, was carried with great rapidity from village to village; and the prince in a little time found himself surrounded by all his warriors ready to obey his commands.

CRANTOR, in entomology. See SPHINX.

CRANTZIA, in botany. See TRICERA.

CRANZIA. See SCROPOLIA.

CRAPE, a light transparent stuff, in manner of gauze: made of raw silk gummed and twisted on the mill, woven without crossing, and much used in mourning. Crapes are either craped (*i. e.* crisped), or smooth; the first double, expressing a closer mourning; the latter single, used for that less deep. The white is reserved for young people. The silk destined for the first is more twisted than that for the second; it being the greater or less degree of twisting, especially of the warp, which produces the crisping given it when taken out of the loom, steeped in clear water, and rubbed with a piece of wax for the purpose. Crapes are all dyed raw. The invention of this stuff came originally from Bologna; but, till of late years, Lyons is said to have had the chief manufacture of it.

CRAPULA. See SURFEIT.

CRA'PULENCE. *s.* (*crapula*, a surfeit, Lat.) Drunkenness; sickness by intemperance.

CRA'PULOUS. *a.* (*crapulosus*, Latin) Drunken; sick with intemperance.

To CRASH. *v. n.* To make a loud complicated noise, as of many things falling or breaking at once (*Smith*).

To CRASH, *v. a.* To break or bruise (*Shakspeare*).

CRASH. *s.* (from the verb.) A loud sudden mixed sound (*Shakspeare. Pope*).

CRA'SIS. (*crasis*, κρασις; from κεραννυμι, to

mix.) A term applied to the humours of the body, when there is such an admixture of their principles as to constitute a healthy state: hence, in dropsies, scurvy, &c. the crasis, or healthy mixture of the principles of the blood, is destroyed.

CRASPEDIA. In botany, a genus of the class syngenesia, order polygamia segragata. Calyx imbricate; without calycle; florets in a few depressed bundles, all hermaphrodite and tubular: receptacle chaffy; down feathery. One species only; a native of New Zealand.

CRASS. *a.* (*crassus*, Latin.) Gross; coarse; not thin; not subtle (*Woodward*).

CRA'SSAMENT. (*crassamentum*, from *crassus*, thick.) See BLOOD.

CRASSINA, in botany. See ZIMMIA.

CRA'SSITUDE. *s.* (*crassitudo*, Latin.) Grossness; coarseness; thickness (*Bacon*).

CRA'SSULA. (*crassula*, from *crassus*, thick: so named from the thickness of its leaves.) See FABA CRASSA. Lesser orpine, or live-ever. In botany, a genus of the class pentandria, order pentagynia. Calyx five-leaved; petals five; nectariferous scales five, at the base of the germ; capsules five. Sixty-nine species—Cape plants with few exceptions, some shrubby, but more herbaceous; the former about eight feet, the latter about one foot high, with thick, oblong, succulent leaves, and five-petalled flowers of a white, red or yellow hue. They may be propagated among ourselves by offsets or cuttings; but require attention and the heat of a stove.

CRASSUS. A name common to some eminent Romans, the most conspicuous of whom is M. Licinius, surnamed Rich, on account of his wealth acquired by educating slaves, and selling them at a high price. The cruelties of Cinna obliged him to retire to Spain, where he remained concealed for eight months. After Cinna's death, he served Sylla, and ingratiated himself in his favour. When the gladiators, with Sparticus at their head, had defeated some of the Romish generals, Crassus was sent against them, slaughtered 12,000 of the slaves, and, by this decisive blow, soon put an end to the war. He was honoured with an *ovatio* at his return. He was soon after made consul with Pompey, then censor, and formed the first triumvirate with Pompey and Cæsar. As his love of riches was more predominant than that of glory, he was satisfied with the province of Syria, which seemed to promise an inexhaustible source of wealth. He set off from Rome for Asia, and on his arrival crossed the Euphrates, and hastened to make himself master of Parthia. He was betrayed in his march by the delay of Artavasdes, king of Armenia, and the perfidy of Ariamnes. He was met in a large plain by Surena, the general of the forces of Orodes, king of Parthia; and a battle was fought, in which 20,000 Romans were killed, and 10,000 taken prisoners. Crassus, forced by the mutiny and turbulence of his soldiers, and the treachery of his guide, then trusted himself to the general of the enemy, on pretence of proposing terms of accommodation, and was put to death, B. C. 53. His head was cut off, and sent to Orodes, who poured melted lead down his throat, and insulted his misfortunes. Though he has been called avaricious, yet he showed himself always ready to lend money to his friends without interest. He was fond of philosophy, and his knowledge of history was great and extensive. Plutarch has written his life.

CRASTINA'TION. *s.* (from *cras*, Latin, to-morrow.) Delay.

CRATÆGUS, in botany, a genus of the icosandria digynia class and order. Natural order of pomacæ. Rosaceæ, Jussieu. Calyx five-cleft; petals five; berry inferior, two-seeded. There are twenty-three species. This genus consists chiefly of shrubs of trees, hardy and deciduous; leaves simple, undivided, or lobed; peduncles in most species many-flowered: corymbs terminating, and solitary from the axils; corols white, appearing in May and June, and succeeded by red berries in autumn. The species of this tribe are now usually included under the genus MESPILUS, which see.

CRATÆVA. Garlic-pear. A genus of the class dodecandria, order monogynia. Calyx four-cleft; corol four-petalled; berry one-celled, many seeded. Five species. India, West Indies, Sierra Leone. Of these the chief is c. tapia: an East Indian plant, rising thirty feet high, with ovate, pointed leaves; panicled flowers with a stipitate germ. The fruit is smooth and round, size that of an orange, of a garlic smell, communicated to animals that feed upon it. The young vernal buds applied to the naked skin act as a vesicatory like cantharides. It may be propagated in our own country by seeds.

CRATCH. *s.* (*creche*, French.) The palisaded frame in which hay is put for cattle (*Hakewill*).

CRATER, in astronomy, the cup, an old southern constellation, consisting of 30 stars of the first six magnitudes, i. e. 0. 0. 1. 10. 7. 12.

CRATER, is also used to signify the mouth or opening of a volcano, or burning mountain, from whence the fire, &c. is discharged. See VOLCANO.

CRATES, a philosopher of Bœotia, son of Ascondus, and disciple of Diogenes the Cynic, B. C. 324, was remarkable for the austerity of his life, and the singularity of his manners. He sold his estates, and gave the money to his fellow-citizens. He was naturally deformed, and he rendered himself more hideous, by sewing sheep's skins to his mantle. He clothed himself as warm as possible in the summer: but in winter, his garments were uncommonly thin, and incapable of resisting the coldness of the season.

CRATICLE. CRATICULA. (dim. of *crates*, a hurdle.) The bars or grate that covers the ash-hole in a chemical furnace.

CRATINUS, a native of Athens, celebrated for his comic writings, and his fondness for drinking. He died at the age of 97, B. C. 431 years. Quintilian greatly commends his comedies.

CRATIPPUS, a philosopher of Mitylene, who taught Cicero's son at Athens, among others. After the battle of Pharsalia, Pompey visited the house of Cratippus, where their discourse was chiefly turned upon Providence, which the warrior blamed, and the philosopher defended. (*Plut. Cic.*).

CRA'VAT. *s.* A neckcloth (*Hudibras*).

To CRAVE. *v. n.* (crerian, Saxon.) 1. To ask with earnestness; to ask with submission; to beg; to entreat (*Knolles*). 2. To ask insatiably (*Denham*). 3. To long; to wish unreasonably (*South*). 4. To call for importunately (*Shakspeare*).

CRAVEN, or CRAVENT, a word of reproach used in trials by battle.

CRA'VEN. *s.* 1. A cock conquered and dispirited (*Shakspeare*). 2. A coward; a recreant (*Shakspeare*)

CRA'VEN. *a.* Cowardly; base (*Fairfax*).

To CRA'VEN. *v. a.* (from the noun.) To make recreant or cowardly (*Shakspeare*).

CRA'VER. *s.* (from *crave.*) An insatiable asker (*Clarissa*).

To CRAUNCH. *v. a.* (*schrantsen*, Dutch.) To crush in the mouth (*Swift*).

CRAW. *s.* (*kroe*, Danish.) The crop or first stomach of birds (*Ray*).

CRAW-FISH, in entomology. See CANCER.

To CRAWL. *v. n.* (*kriçlen*, Dutch.) 1. To creep; to move with a slow motion; to move without rising from the ground (*Dry.*). 2. To move weakly and slowly (*Knolles*). 3. To move about hated and despised.

CRA'WLER. *s.* (from *crawl.*) A creeper; any thing that creeps.

CRAX, CURASSOW, or CARAÇOA. In zoology, a genus of the class aves, order gallinæ. Bill strong, thick, the base of each mandible covered with a cere; nostrils in the middle of the cere; feathers covering the head revolute; tail large, straight, expansile. Five species—all inhabitants of South America.

1. C. alector. Cere yellow; body black; belly white. Three other varieties, differing in the colour of the cere or belly. The females again differ from the males in their colours, but in no other external mark. Inhabits the mountainous woods of South America; three feet long; feeds on fruits, and roosts in trees.

2. C. globicera. Globose curassow. Yellow; gibbosity of the nostrils globular; body blackish blue; lower part of the belly white. Inhabits Guiana; size of the former.

3. C. pauxi. Cushew curassow. Cere blue; gibbosity of the nostrils crested; body blackish; belly and tip of the tail white. Inhabits New Spain: size of the two former.

4. C. galeata. Galeated curassow. Crown with a horny cone; body black; vent white. Inhabits the island Curassow or Caraçoa; nearly as large as a turkey.

5. C. vociferans. Crying curassow. Brown; bill and breast blue; belly whitish. Inhabits the mountainous parts of Mexico; size of a common fowl; a very noisy clamorous bird.

CRAY-FISH. See CANCER.

CRAYER (Gaspar de), a Flemish painter, born at Antwerp in 1585. He was the disciple of Coxis the Younger, whom he far surpassed. The king of Spain settled upon him a pension; and Rubens had a great respect for him. He excelled in portrait painting, though he executed some historical subjects. He died in 1669.

CRAYON, a general name for any coloured stone, earth, or other substance, used in designing or painting in pastel; whether they have been beaten and reduced to a paste, or are used in their primitive consistence, after sawing or cutting them into long narrow slips. In this last manner are red crayons made, of bloodstone or red chalk; black ones, of charcoal and black lead, &c. Crayons of all other colours are compositions of earths reduced to paste.

CRAYON-PAINTING. Whether the painter works with oil-colours, water-colours, or crayons, the grand object of his pursuit is still the same: a just imitation of nature. But each species has its peculiar rules and methods. Painting with crayons requires in many respects a treatment different from painting in oil-colours; because all colours used dry are in their nature of a much warmer complexion than when wet with oils, &c. For this reason, in order to produce a rich picture, a much greater portion of what painters term *cooling tints* must be applied in crayon-painting than would be judicious to use in oil. Without any danger of a mistake, it may be supposed, that the not being acquainted with this observa ion is one great cause why so many oil-painters have no better success when they attempt crayon-painting. On the contrary, crayon-painters being so much used to those tints which are of a cold nature when used wet, are apt to introduce them too much when they paint with oils, which is seldom productive of a good effect.

Whoever would practise this art must provide himself with some strong blue or grey paper, the thicker the better, if the grain is not too coarse or knotty, though it is almost impossible to get any entirely free from knots. Paper of a suitable quality in every respect may be had at most of the colour-shops in London. The student will find the sitting posture, with the box of crayons in his lap, the most convenient for himself. The part of the picture he is immediately painting should be rather below his face; for, if it be placed too high, the arm will be fatigued. Let the windows of the room where he paints be darkened, at least to the height of six feet from the ground; and the subject to be painted should be situated in such a manner, that the light may fall with every advantage on the face, avoiding too much shadow, which seldom has a good effect in portrait painting, especially if the face he paints from has any degree of delicacy.

Before he begins to paint, let him be attentive to his subject, and appropriate the action or attitude proper to the age of the subject. The embellishments of the picture should also be regulated by the rules of propriety and con-

sistency. Having observed this, let him proceed to draw the outline of the whole figure with a black lead pencil, or with white chalk. The artist must next employ himself on the features of the face; the outline of which being correct, let him take a crayon of pure carmine, and carefully draw the nostril and edge of the nose next the shadow; then, with the faintest carmine tint, lay in the highest light upon the nose and forehead, which must be executed broad. He is then to proceed gradually with the second tint, and the succeeding ones, till he arrive at the shadows, which must be covered brilliant, enriched with much lake, carmine, and shaded with a blackish green. This method will at first offensively strike the eye, from its crude appearance; but in the finishing, it will be a good foundation to produce a pleasing effect, colours being much more easily sullied when too bright than when the first colouring is dull, to raise the picture into a brilliant state.

Of the materials.—The perfection of crayons consists, in a great measure, in their softness; for it is impossible to execute a brilliant picture with them if they are otherwise; on which account great care should be observed in preparing them, to prevent their being hard. In all compositions, flake-white and white lead should be wholly rejected, because the slightest touch with either of these would unavoidably turn black.

The usual objection to painting in crayons is, that they are subject to change; but whenever this happens, it is entirely owing to an injudicious use of the above-mentioned whites, which will stand only in oils. To obviate these bad effects, let the student make use of common whiting, washed, and made up into a crayon.

As those students who attempt the art of crayon-painting may be readily supplied by the shops with every kind of crayon, we shall not enter into the manner of their preparation farther than to observe, that in most cases the colouring matter is struck upon some soft and white earth, as alumine, and the mass whilst moist, like clay, rolled up in the shape of pencils, and dried for use. This observation applies only to colours derived from animal or vegetable substances; but crayons of many kinds may be formed of the pure earths alone, without any other preparation than that of moistening, rolling, and afterwards drying them. Colours naturally so hard as not to mark easily upon paper require to be blended with alumine or some other earth of a loose texture, by which this quality may be corrected. We will instance this in the preparation of crayons from carmine, the texture of which is inclinable to hardness: take a sufficient quantity of carmine, lay it upon a grinding-stone, and grind it with spirits of wine till it becomes smooth. The simple colour being thus prepared, the next is to compose the different tints by a mixture with alumine or whiting. The proportion to be observed consists of 20 gradations to one, which may be clearly understood by the following directions: To three parts of the simple colour, thus levigated, add about one part of the white earth. Of this, when properly incorporated, make two parcels. The next gradation should be composed of equal quantities of carmine and whiting, of which four crayons may be made. The third composition should have one-fourth carmine and three-fourths whiting; of this make six crayons, which will be a good proportion with the rest. The last tint should be made of whiting, very faintly tinged with carmine, of which make about eight crayons, which will complete the above-mentioned proportion. As these compound tints are levigated, they are to be laid immediately upon a chalk-stone, that the moisture may be absorbed to the proper degree of dryness for forming into crayons, which may be known by its losing the greater part of its adhesive quality when taken into the hand; if the consistence is found to be right, it may be formed into pencils and then laid upon glass to dry. On this subject the reader may consult M. Lomet's Essay in Annal. de Chemié, No. 90. an. 7.

To CRAZE. *v. a.* (*ecraser*, French.) 1. To break; to crush; to weaken (*Milton*). 2. To powder (*Carew*). 3. To crack the brain; to impair the intellect (*Tillotson*).

CRA'ZEDNESS. *s.* (from *crazed.*) Decrepitude; brokenness (*Hooker*).

CRA'ZINESS. *s.* (from *crazy.*) State of being crazy; imbecility; weakness (*Howel*).

CRA'ZY. *a.* (*ecrasé*, French.) 1. Broken; decrepit (*Shakspeare*). 2. Broken-witted; shattered in the intellect (*Hudibras*). 3. Weak; feeble; shattered (*Wake*).

To CREAK. *v. n.* (corrupted from *crack.*) To make a harsh protracted noise (*Dryden*).

CREAM, the most oily part of milk: it is specifically lighter than the other constituents, collects and floats on the surface, whence it is generally skimmed, in order to separate effectually the caseous and serous parts employed for the making of BUTTER and CHEESE, to which we refer.

Cream is an agreeable and very nourishing article of food, when fresh; but too fat and difficult to be digested by persons of a sedentary life, or possessed of a weak stomach. It is, nevertheless, of considerable service in medicine, as a lenient (though palliative) application to tetters and erysipelas, which are attended with pain, and proceed from acrid humours.

A method of preserving cream.—Take 12 ounces of white sugar, and dissolve them in the smallest possible quantity of water, over a moderate fire. After the solution has taken place, the sugar ought to be boiled for about two minutes in an earthen vessel; when 12 ounces of new cream should be immediately added, and the whole uniformly mixed, while hot. Let it then gradually cool, and pour it into a bottle, which must be carefully corked. If kept in a cool place, and not exposed to the air, it may be preserved in a sweet state for several weeks, and even months.

CREAM OF TARTAR. See TARTRIS POTASSÆ ACIDULUS.

CREAM signifies also, figuratively, the best part of any thing.

To CREAM. *v. a.* (from the noun). 1. To skim off the cream. 2. To take the flower and quintessence of any thing (*Swift*).

To CREAM. *v. n.* To gather cream (*Shakspeare*).

CREAM-FACED. *a.* (*cream* and *face*.) Pale; coward-looking (*Shakspeare*).

CRE'AMY. *a.* (from *cream*.) Full of cream; having the nature of cream.

CRE'ANCE. *s.* (French.) A fine small line fastened to a hawk's leash.

CREASE. *s.* A mark made by doubling any thing (*Swift*).

To CREASE. *v. a.* To mark any thing by doubling it, so as to leave the impression.

To CREA'TE. *v. a.* (*creo*, Latin.) 1. To form out of nothing; to cause to exist (*Genesis*). 2. To produce; to cause; to be the occasion of (*King Charles*). 3. To beget (*Shakspeare*). 4. To invest with any new character (*Shakspeare*). 5. To give any new qualities (*Davies*).

CREA'TION. *s.* (from *create*.) 1. The act of creating, or conferring existence (*Taylor*). 2. The act of investing with new qualities or character. 3. The things created; the universe (*Parnel*). 4. Any thing produced, or caused (*Shakspeare*).

CREA'TION (New). See REGENERATION.

CREA'TIVE. *a.* (from *create*.) 1. Having the power to create (*Thomson*). 2. Exercising the act of creation (*South*).

CREA'TOR. *s.* (*creator*, Latin.) The being that bestows existence (*Taylor*).

CRE'ATURE. *s.* (*creatura*, low Latin.) 1. A being created (*Stillingfleet*). 2. Any thing created (*Bacon*). 3. An animal, not human (*Shakspeare*). 4. A general term for man (*Spenser*). 5. A word of contempt for a human being (*Prior*). 6. A word of petty tenderness (*Dryden*). 7. A person who owes his rise or his fortune to another (*Clarendon*).

CRE'ATURELY. *a.* (from *creature*.) Having the qualities of a creature (*Cheyne*).

CREBILLON (Prosper Joliot de), a French tragic poet, born at Dijon in 1674, and died in 1762. He was a man of a whimsical character, but his plays are reckoned very good.

CREBILLON (Claude Prosper Joliot de), the son of the above, born at Paris in 1707, and died there in 1777. He wrote several novels, very lively, but licentious. His works were printed in 11 vols. 12mo. 1779.

CRE'BRITUDE. *s.* (from *creber*, frequent, Latin.) Frequentness.

CRE'BROUS. *a.* (*creber*, Latin.) Frequent.

CRE'DENCE. *s.* (from *credo*, Latin; *credence*, French.) 1. Belief; credit (*Spenser*). 2. That which gives a claim to credit or belief (*Hayward*).

CREDE'NDA. *s.* (Latin.) Things to be believed; articles of faith (*South*).

CRE'DENT. *a.* (*credens*, Latin.) 1. Believing; easy of belief (*Shakspeare*). 2 Having credit; not to be questioned (*Shakspeare*)

CREDE'NTIAL. *s.* (from *credens*, Latin.) That which gives a title to credit (*Addison*).

CREDENTIALS, letters of credit and recommendation, especially such as are given to ambassadors, plenipotentiaries, &c. sent to foreign courts.

CREDIBI'LITY. *s.* (from *credible*.) Claim to credit; possibility of obtaining belief (*Tillotson*).

As the credibility of human testimony is an interesting topic, especially in its application to the Christian revelation, we shall here present the reader with a few propositions relating to it.

Moral certitude absolute, is that in which the mind of man entirely acquiesces, requiring no further assurance. As if one, in whom I absolutely confine, shall bring me word of 1200*l.* accruing to me by gift, or a ship's arrival; and for which therefore I would not give the least valuable consideration to be ensured.

Moral certitude incomplete, has its several degrees to be estimated by the proportion it bears to the absolute. As if one, in whom I have that degree of confidence, as that I would not give above one in six to be ensured of the truth of what he says, shall inform me, as above, concerning 1200*l.* I may then reckon that I have as good as the absolute certainty of 1000*l.* or five-sixths of absolute certainty for the whole sum.

The credibility of any reporter is to be rated, 1. By his integrity, or fidelity; and 2. By his ability. And a double ability is to be considered; both that of apprehending what is delivered, and also of retaining it afterwards, till it be transmitted.

The two first of the subsequent propositions respect the reporters of the narrative as they either transmit successively, or attest concurrently: the 3d the subject of it; as it may consist of several articles; and the 4th joins those three considerations together, exemplifying them in oral and in written tradition.

PROP. I. Concerning the credibility of a report, made by single successive reporters, who are equally credible.

Let their reports have each of them five-sixths of certainty; and let the first reporter give me a certainty of 1000*l.* in 1200*l.* It is plain that the second reporter, who delivers that report, will give me the certainty but of five sixths of that 1000*l.* or the five sixths of five-sixths of the full certainty for the whole 1200*l.* and so a third reporter, who has it from the second, would have delivered me, &c.

That is, if a be put for the share of assurance a single reporter gives me, and c for that which is wanting to make that assurance complete; and I therefore supposed to have $\frac{a}{a+c}$ of certainty from the first reporter, I shall have from the second, $\frac{aa}{(a+c)^2}$ from the third, $\frac{a^3}{(a+c)^3}$, &c. And accordingly if a be $= 100$, and $c = 6$, (the number of pounds that an 100*l.* put out to interest brings at the year's end) and consequently my share of certainty from one reporter, be $= \frac{100}{106}$ (which is the present value of any sum to be paid one year hence) the proportion of certainty coming to me from a second will be $\frac{100}{106}$ multiplied by $\frac{100}{106}$ (which

is the present value of money to be paid after two years) and that from a third hand reporter $=\frac{100}{106}$, thrice multiplied into itself (the value of money payable at the end of three years), &c.

Corollary. And therefore, as at the rate of six per cent. interest the present value of any sum payable after twelve years, is but half the sum: so if the probability or proportion of certitude transmitted by each reporter be $\frac{100}{106}$, the proportion of certainty after twelve such transmissions, will be but as half; and it will grow by that time an equal lay, whether the report be true or no. In the same manner, if the proportion of certainty be set at $\frac{100}{101}$, it will come to a half from the 70th hand: and if at $\frac{1000}{1001}$ from the 695th.

Prop. II. Concerning concurrent testimony.

Let there be two dies of the same kind, in each of which the number of white faces is m, each also having but one black face; and suppose that these dies being thrown together, it be required to determine, what is the proportion of the number of chances that two white faces will turn up, to the number of chances that two black faces will turn up together. The number of combinations of two white faces is the square of m; and the number of combinations of black faces is unity. Therefore the odds that two white faces will turn up rather than two black faces, is as m^2 to 1. The cases where a black and a white face turn up together, are excluded by the nature of the proposition, because the witnesses are supposed to be concurrent, that is, that the faces of the dies are of the same colour. In like manner, if there be three dies of the same kind as before, the odds that three white faces will turn up together, rather than three black faces, will be m^3 to 1; and so on, the index of m being always equal to the number of dies.

Now, if the number of chances that any witnesses respectively tell truth, to the number of chances of their telling falsehood be as m to 1; the odds that they tell truth rather than falsehood, on supposition that they are concurrent, will be determined in the same manner; that is, will be as that power of the number of chances of their telling truth, whose index is the number of witnesses, to unity.

The series of antecedents whose common consequent is unity, which express the ratio of the probability of the truth and falsehood of the concurring reporters, being the successive powers of a given number greater than unity, increase in geometrical progression, and therefore will at length exceed any number however great. And if concurring reporters be all of equal credibility, their number may be so far increased as to produce a probability greater than any that can be assigned. For, let any proposed degree of probability be $=\frac{a}{a+1}$; and let the probability that a given witness tells truth be expressed by the fraction $\frac{b}{b+1}$, b being less than a: take such a power b^n of b, as that it shall exceed a, and let n be the number of witnesses; then will the probability of the veracity of the concurrent witnesses be expressed by the fraction $\frac{b^n}{b^n+1}$; which is greater than the fraction $\frac{a}{a+1}$, because unity, the given difference of the numerators and denominators, bears a less proportion to the greater quantity b^n, and therefore the quantities b^n and b^n+1, are more nearly equal than the numerator and denominator of the fraction $\frac{a}{a+1}$; or, in other words, $\frac{b^n}{b^n+1}$ is nearer equity, which here expresses certainty, than $\frac{a}{a+1}$.

Corol. 1. If the chances for the truth and falsehood of the report of each of any concurrent witnesses be equal, no number whatever of such witnesses will add to the probability of the event. For in this case we should have $\frac{b}{b+1}=\frac{1}{1+1}$, and $\frac{b^n}{b^n+1}=\frac{1}{1+1}=\frac{1}{2}$, also.

Corol. 2. Where the credibility of each witness is great, a very few witnesses will be sufficient to overcome the contrary probability, derived from the nature of the fact. Thus, suppose the latter probability $=\frac{6560}{6561}$; and let us suppose that each witness tells truth only nine times for once that he tells falsehood; that is, let the probability of the truth of his report be equal only to $\frac{9}{10}$; then four such concurring witnesses will be sufficient to produce belief.

Corol. 3. After a certain number of concurring credible witnesses have given their testimony in confirmation of the truth of a fact, any farther increase of their number is superfluous; because the difference between unity and the fraction expressing the probability which is the result of their concurrent testimony, is indefinitely little; and all that an indefinite increase of the number of witnesses could do, would be to diminish that indefinitely little defect.

Corol. 4. The evidence of testimony can overcome any degree of improbability, however great, which can be derived from the nature of the fact.

Let any event consistent with what is usually termed the course of nature, have its evidence rest upon an immense number of experiments, either made by ourselves, or reported by others, be represented by $\frac{e}{e+1}$; and let the direct and positive testimony of a single witness, that the contradictory of this event did actually happen, have its probability valued at $\frac{t}{t+1}$. Let the evidence of the single witness be less than the evidence of universal experience on which the physical phænomenon rests, in any assigned proportion; that is, let t be less than e, in the proportion of 1 to m: then $mt=e$, and $\frac{e}{e+1}=\frac{mt}{mt+1}$. Take now such a power t^n of t, as that it shall be greater than mt, and $\frac{t^n}{t^n+1}$ will be greater than $\frac{e}{e+1}$; that is, if n be the number of witnesses each of whose veracity is measured by $\frac{t}{t+1}$, their concurrent testimony, will be sufficient to overcome the contrary probability derived from the nature of the fact. So that the evidence of testimony can not only approach indefinitely near to certainty, but can at length exceed the evidence of any inference, however cogent, which can possibly be deduced from personal experience, or

from personal and derived experience conjointly. And thus is demonstrated the futility of Hume's principal argument against miracles.

PROP. III. Concerning the credit of a reporter for a particular article of that narrative, for the whole of which he is credible in a certain degree.

Let there be six particulars of a narrative equally remarkable. If he to whom the report is given, has five-sixths of certainty for the whole sum of them, he has thirty-five to one, against the failure in any one certain particular.

For he has five to one there will be no failure at all: and if there be, he has yet another five to one, that it falls not upon that single particular of the six: that is, he has $\frac{5}{6}$ of certainty for the whole, and of the $\frac{1}{6}$ wanting he has likewise $\frac{5}{6}$, or $\frac{5}{36}$ of the whole, more; and therefore that there will be no failure in that single particular, he has $\frac{5}{6}$ and $\frac{5}{36}$ of certainty; or $\frac{35}{36}$ of it.

In general, if $\frac{a}{a+c}$ be the proportion of certainty for the whole, and $\frac{m}{m+n}$ be the chance of the rest of the particular articles m, against some one or more of them, n, there will be nothing wanting to an absolute certitude, against the not failing in the article or articles n, but only $\frac{nc}{(m+n)\times(a+c)}$.

PROP. IV. Concerning the truth of either oral or written tradition (in whole, or in part), successively transmitted, and also co-attested by several successions of transmittents.

1. Supposing the transmission of an oral narrative to be so performed by a succession of single men, or joined in companies, as that each transmission, after the narrative has been kept for twenty years, impairs the credit of it a twelfth part; and that consequently in the twelfth hand, or at the end of 240 years, its certainty is reduced to a half; and there grows then an even lay against the truth of the relation: yet if we further suppose, that the same relation is coattested by nine other several successions, transmitting alike each of them, the credibility of it when they are all found to agree, will (by the corollary of the first proposition) be as $\frac{1023}{1024}$ of certainty, or above a thousand to one; and if we suppose a co-attestation of nineteen, the credibility of it will be as above two millions to one.

2. In oral tradition, as a single man is subject to much casualty, so a company of men cannot be so easily supposed to join; and therefore the credibility of $\frac{100}{106}$, or about $\frac{19}{20}$, may possibly be judged too high a degree for an oral conveyance, to the distance of twenty years. But in written tradition, the chances against the truth or conservation of a single writing are far less; and several copies may also be easily supposed to concur, and those, since the invention of printing, exactly the same; several also distinct successions of such copies may be as well supposed, taken by different hands, and preserved in different places or languages.

And therefore if oral tradition by any one man, or company of men, might be supposed to be credible after twenty years, or $\frac{19}{20}$ of certainty; or but $\frac{9}{10}$ or $\frac{5}{6}$; a written tradition may be well imagined to continue, by the joint copies that may be taken of it for one place (like the several copies of the same impression) during the space of 100, if not 200 years; and to be then credible at $\frac{100}{101}$ of certainty, or at the proportion of 100 to 1. And then seeing that the successive transmissions of this $\frac{100}{101}$ of certainty, will not diminish it to a half until it passes the 69th hand (for it will be near 70 years before the rebate of money, at that interest, will sink it to half) it is plain, that written tradition, if preserved but by a single succession of copies, will not lose half of its full certainty, until 70 times 100, if not 200 years are past; that is 7,000, if not 14,000 years. And further, that if it be likewise preserved by concurrent successions of such copies, its credibility at that distance may be even increased, and grow far more certain from the several agreeing deliveries at the end of 70 successions, than it would be at the very first from either of the single hands!

We wish the candid reader to apply this mode of argumentation to the credibility of the Gospel testimony.

3. Lastly, in stating the proportions of credibility for any part or parts of a copy, it may be observed, that in an original, not very long, good odds may be laid, that a copy by a careful hand shall not have so much as one literal fault: but in one of greater length, that there may be greater odds against any material error, and such as shall alter the sense; greater yet, that the sense shall not be altered in any considerable point; and still greater, if there be many of these points, that the error lights not upon such a single article; as in the third proposition.

From the contemplation of the preceding propositions, and a comparison of their results, with the deductions in experimental philosophy, the foundations of credibility may be rendered still more obvious.

In our experience of a course of nature, our conviction is not always in proportion to the number of experiments in a given instance, though it is in proportion to the whole number of experiments on which our belief is founded: thus, if a new metal be discovered which is found specifically heavier than lead, we conclude from that single experiment, that it will sink in water, with a confidence as great as that lead itself, on which we have made so many experiments, will sink in water. The reason of this is, because we transfer to this particular instance the sum of our experiments on other substances specifically heavier than water, which have always been observed to sink in it. And in this way it is, that the regard we pay to the report of a witness, is not always in proportion to the number of instances in which we have found he has told truth, namely, because we apply to him the sum of all those indications of veracity, which in previous instances we have observed in others.

Still, it will be seen from what is done above, that the conviction produced by testimony is capable of being carried much higher than the conviction produced by other experience; and the reason is this, because there may be concurrent testimonies with respect to the truth of the same individual fact (and these concurrent testimonies must in all cases where the reporters tell more truths than falsehoods, augment the credibility), whereas there can be no concurrent experiments with respect to an individual experiment. There may, indeed, be analogous experiments, in the same manner as there may be analogous testimonies; but in a course of nature there is but one continued series of events, whereas in testimony, since the same event may be observed by different witnesses, their concurrence is capable of producing a con-

viction, more cogent than any which is derived from any other species of events in the course of nature. In material phænomena, the probability of an expected event depends solely on analogous experiments, which have been made previous to the event; and this probability admits of indefinite increase, from the unlimited increase of the number of these precedent experiments. The credibility of a witness likewise arises from our experience of the veracity of previous witnesses, and admits of unlimited increase, according to their number; the law of its increase being, of course, the same with that derived from physical events. There is, however, another source of the increase of testimony, which is likewise unlimited, derived from the number of concurrent witnesses, and its increase on this account (as above shewn) follows a law different from the former. The evidence of testimony, therefore, admitting of an unlimited increase on two different accounts, and the probability of the happening of any specific event admitting only of one of them, the former is capable of indefinitely surpassing the latter.

Those who wish to go farther into this curious subject may read Bernoulli's Treatise De Arte Conjectandi; an ingenious paper, in No. 93 of Nicholson's Journal, by Mr. Saint, of the Royal Military Academy; Dr. Matthew Young's paper on the Force of Testimony in establishing Facts contrary to Analogy, in vol. vii. Irish Transactions; Dr. Waring on the Principles of Human Knowledge; and Hartley on Man, vol. i. prop. 87.

CRE'DIBLE. *a.* (*credibilis*, Latin.) Worthy of credit; having a just claim to belief (*Tillotson*).

CRE'DIBLENESS. *s.* (from *credible.*) Credibility; worthiness of belief (*Boyle*).

CRE'DIBLY. *ad.* (from *credible.*) In a manner that claims belief (*Bacon*).

CRE'DIT. *s.* (*credit*, French.) 1. Belief; faith yielded to another (*Addison*). 2. Honour; reputation (*Pope*). 3. Esteem; good opinion (*Bacon*). 4. Faith; testimony (*Hook.*). 5. Trust reposed (*Locke*). 6. Promise given (*Addison*). 7. Influence; interest (*Claren.*).

CREDIT, an ancient right which lords had over their vassals; consisting in this, that during a certain time they could oblige them to lend them money.

To CRE'DIT. *v. a.* (*credo*, Latin.) 1. To believe (*Shakspeare*). 2. To procure credit or honour to any thing (*Waller*). 3. To trust; to confide in. 4. To admit as a debtor.

CRE'DITABLE. *a.* (from *credit.*) 1. Reputable; above contempt (*Arbuthnot*). 2. Honourable; estimable (*Tillotson*).

CRE'DITABLENESS. *s.* (from *creditable.*) Reputation; estimation (*D. of Piety*).

CRE'DITABLY. *ad.* (from *creditable.*) Reputably; without disgrace (*South*).

CREDITON, a town in Devonshire, with a market on Saturday. It contains nearly 5000 inhabitants, and has a considerable manufacture of serges. Lat. 50. 49 N. Lon. 3. 45 W.

CRE'DITOR. *s.* (*creditor*, Latin.) He to whom a debt is owed; he that gives credit: correlative to *debtor* (*Swift*).

CREDU'LITY. *s.* (*credulité*, French.) Easiness of belief; readiness of credit (*Sidn.*).

CRE'DULOUS. *a.* (*credulus*, Latin.) Apt to believe; unsuspecting; easily deceived (*Milton*).

CRE'DULOUSNESS. *s.* (from *credulous.*) Aptness to believe; credulity.

CREE-INDIANS. Indians of North America, who occupy the district W. of little lake Winnipeg, and fort Dauphin, in Upper Canada.

CREECH (Thomas), an English poet. He was born in Dorsetshire in 1659, and educated at Oxford, where he proceeded to the degree of M.A. In 1701 he obtained the living of Welwyn in Hertfordshire, but the same year he put an end to himself at Oxford; the cause of which is not exactly known. He translated Lucretius into English verse, 1682; Horace, in 1684; Theocritus, in the same year; and various other authors.

CREED. *s.* (from *credo*, Latin.) 1. A form of words in which the articles of faith are comprehended (*Fiddes*). 2. Any solemn profession of principles or opinion (*Shaksp.*).

CREED (Apostle's), is so called, because for many ages it was believed to have been framed by the apostles before they left Jerusalem. The first person who gave this account of its original was St. Ambrose, towards the latter end of the fourth century; in which he is followed by Ruffinus, Jerome, and several others: and some have even asserted, that each apostle supplied his particular article. (See SYMBOL.) But there are many reasons why this account cannot be admitted: if a creed of such high authority had existed in the Christian church, it is reasonable to suppose that it would have been mentioned by St. Luke in the history of the Acts of the Apostles, or by some of the earlier writers in the first four centuries, before the time of St. Ambrose; that it would have been referred to as a standard of doctrine by the more ancient councils; and that it would have superseded the necessity of composing new creeds, which was done on many occasions. Besides, the several copies of this creed, of which the principal are the vulgar or Roman, the Aquileian, and the Oriental, differ from one another in many articles; and this difference cannot easily be reconciled with the notion, that it was framed by the apostles, and transmitted from them to their successors. To which we may add, that some of the articles contained in it were inserted in opposition to errors that sprung up in the Christian church, long after the time of the apostles. However, this creed is a very ancient composition, and upon the whole an unexceptionable summary of the Christian doctrine, and much superior to compositions of a similar kind of later date. It might in part have been transmitted down from the apostles, and afterwards gradually enlarged in its present form as occasion required. Lord King's Crit. Hist. of the Apostles' Creed. See SYMBOL.

CREED (Athanasian), has been falsely attributed to Athanasius, bishop of Alexandria, who lived and wrote in the fourth century: it is neither mentioned nor referred to in any

of his genuine works; no notice is taken of it by writers who immediately succeeded him; it was never appealed to for the decision of the controversy relating to the procession of the Spirit between the Eastern and Western churches, in the seventh and ninth centuries; nor is it quoted, say some, till one thousand years after Christ. Fabricius is of opinion, that it was first written in Latin long after the fifth century, and afterwards translated into Greek. It is appointed to be read in the service of the church of England thirteen times in the year. Vossii Diss. de Symbolis. Fabr. Bib. Græc. vol. v.

The damnatory clauses in this creed have long caused serious uneasiness to pious men of different denominations. Some of our dignified clergy have expressed themselves concerning it in the following terms. "The account given of Athanasius's creed," says the excellent archbishop Tillotson, "seems to me nowise satisfactory; I wish we were well rid of it." The good and learned bishop Taylor, in his Liberty of Prophesying (Sect. ii. § 36) has the following observation: "If it were considered concerning Athanasius's creed, how many people understand it not, how contrary to natural reason it seems, how little the scripture says of these curiosities of explication, and how tradition was not clear on his side for the article itself, much less for those forms and minutes; it had not been amiss if the final judgment had been left to Jesus Christ; and indeed, to me it seems very hard to put uncharitableness into the creed, and so to make it become as an article of faith." The present bishop of Lincoln, Dr. Prettyman, says, in his Elements of Christian Theology (vol. ii. p. 220). "It certainly is to be lamented, that assertions of so peremptory a nature," referring to the damnatory clauses, "unexplained and unqualified, should have been used in human composition." "I am ready to acknowledge (p. 222.) that, in my judgment, notwithstanding the authority of former times, our church would have acted more wisely, and more consistently with its general principles of mildness and toleration, if it had not adopted the damnatory clauses of the Athanasian creed. Though I firmly believe that the doctrines themselves are all founded in scripture, I cannot but conceive it to be both unnecessary and presumptuous to say that 'except every one do keep them whole and undefiled, he, without doubt, shall perish everlastingly.'"

Creed (Nicene), was composed and established as a proper summary of the Christian faith by the council at Nice, A. D. 325, against the Arians. This is also called the Constantinopolitan creed, because it was confirmed with some few alterations by the council of Constantinople, A. D. 381.

These three creeds are used in the public offices of the church of England; and subscription to them is required of the clergy, and as the law formerly stood, of dissenting teachers properly qualified by the toleration act.

To CREEK. *v. a.* (see *To* Creak.) To make a harsh noise (*Shakspeare*).

Creek. *s.* (cꞃecca, Saxon; *kreke*, Dutch.) 1. A prominence or jut in a winding coast (*Davies*). 2. A small port; a bay; a cove (*Davies*). 3. Any turn, or alley (*Shakspeare*).

Creek, or Muskogee Indians, the most numerous tribe of Indians of any within the limits of the American United States. They inhabit the middle part of Georgia. They amount to about 17,280, of whom 5,860 are warriors. Their principal town lies in lat. 32. N. lon. 86. 28 W. The country abounding with creeks and rivulets, gave rise to the name.

CRE'EKY. *a.* (from *creek.*) Full of creeks; unequal; winding (*Spenser*).

To CREEP. *v. n.* (pret. *crept.* cꞃẏpan, Sax.) 1. To move with the belly to the ground, without legs, as a worm (*Milton*). 2. To grow along the ground, or on other supports (*Dryden*). 3. To move forward without bounds or leaps, as insects. 4. To move slowly and feebly (*Shakspeare*). 5. To move secretly and clandestinely (*Att.*). 6. To move timorously without soaring, or venturing into dangers (*Addison*). 7. To come unexpected (*Temple*). 8. To behave with servility; to fawn (*Shakspeare*).

CRE'EPER. *s.* (from *creep.*) 1. A plant that supports itself by means of some stronger body (*Bacon*). 2. An iron used to slide along the grate in kitchens. 3. A kind of patten or clog worn by women.

Creeper, in ornithology. See Certhia.

Creeper (Virginian), in botany. See Hedera.

CREE'PHOLE. *s.* (*creep* and *hole.*) 1. A hole into which any animal may creep to escape danger. 2. A subterfuge; an excuse.

CREEPING ROOT, in botany. (*radix repens.*) Extending itself horizontally, and putting forth fibres; as in mint.

Creeping stem. (*caulis repens.*) Running along the ground, or up trees and other bodies; putting forth roots; as in ivy, bignonia, &c.

CREE'PINGLY. *ad.* (from *creeping.*) Slowly; after the manner of a reptile (*Sidney*).

CREM'ASTER. (*cremaster*, κρεμαςηρ; from κρεμαω, to suspend.) A muscle of the testicle by which it is suspended and drawn up, and compressed in the act of coition. It arises from Poupart's ligament, passes over the spermatic cord, and is lost in the cellular membrane of the scrotum, covering the testicles.

CREMATION, is sometimes used for burning, particularly the ancient custom of burning the dead.

CREMNITZ, one of the principal mine towns of Hungary, where gold and silver is coined into money, to the amount of about 100,000 ducats annually. It has greatly suffered from intestine broils; and was totally destroyed by fire in 1777. It experienced a similar fate in 1783. It is 70 miles N. E. of Presburg. Lat. 43. 32 N. Lon. 19. 6 E.

CREMONA, an ancient town of Milan, in

Italy; it is the see of a bishop, and the seat of an university. It is 15 miles E. of Placentia. Lat. 45. 8 N. Lon. 9. 58 E.

CREMONA STOP, on an organ, is a single reed stop, originally designed to imitate an ancient wind instrument, called a knemhorn: but time, and the ignorance of organ-builders, have corrupted this word into cremona, which has led some of late to suppose that this stop was at first intended as an imitation of the violin. See ORGAN.

CREMONESE, a territory of Milan, in Italy, of which Cremona is the capital.

CREMOR. (Latin.) A milky substance; a soft liquor resembling cream.

CREMOR TARTARI. See TARTRIS.

CRENÆA, in botany, a genus of the class dodecandria, order monogynia. Calyx four-cleft bearing the corol; petals four; capsule five-celled; many seeded. One species only; a native of Guiana, with square, knotty stems, and white flowers in axillary corymbs.

CRENATE, in botany, applied to the leaf; scolloped or notched leaf. (*folium crenatum*, from *crena*, a notch.) Having the edge cut with angular or circular incisures, not inclining towards either extremity; as in primula farinosa. When the edge of a leaf is cut into segments of small circles, instead of angular teeth, it is said to be obtusely crenate; when the larger segments have smaller ones upon them, a leaf is then said to be doubly crenate, duplicato crenatum. Linneus's definition in Philosophia Botanica, takes in only the acutely crenate leaf; and therefore incisuris is rightly substituted in Delin. Pl. for angulis.

The same term is applied to the corol in linum, dianthus chinensis, &c. to the nectary, in narcissus triandrus.

When the edge of a leaf is cut into very small notches, Linnéus uses the diminutive crenulate (*crenulatum*.) This term is also applied to the nectary in narcissus poeticus.

CREODIBA, in the customs of the middle age, a robbery and murder committed in a wood, where the body of the person killed was burnt in order to prevent any discovery of the crime.

CREOLES, a name given to the families descended from the Spaniards, who first settled at Mexico.

CRENOPHYLAX, in antiquity, a magistrate of Athens, who had the inspection of fountains.

CRE'PAINE. *s.* (with farriers.) An ulcer seated in the midst of the fore-part of the foot.

CREPANCE, or CREPAUDINE. (from *crepaud*, a canker ulcer.) An accident common to horses, consisting of a tread upon the coronet, or crownet, in the act of managing or passaging, in consequence of their not crossing their legs sufficiently.

CREPIDÆ, that kind of Roman slippers which were always worn with the pallium.

CRE'PIS. Hawk's-beard. In botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle naked, roughish; calyx invested with deciduous scales; down simple; mostly pedicelled. Thirty-one species; chiefly of the Mediterranean coast, or south of Europe; about three, are natives of our own pastures. The common height is that of a foot, or a foot and a half; the flowers are terminal and large, generally red or yellow. They make a beautiful appearance about Midsummer, and produce a considerable quantity of seeds, from which they may be raised without trouble.

To CRE'PITATE. *v. n.* (*crepito*, Latin.) To make a small crackling noise.

CREPITA'TION. *s.* (from *crepitate*.) A small crackling noise.

CREPT. The participle of *creep*.

CREPUNDIA, in antiquity, tokens left with exposed children, by which they might be afterwards known.

CREPU'SCULOUS. *a.* (*crepusculum*, Lat.) Glimmering; in a state between light and darkness (*Brown*).

CREPU'SCULUM, in astronomy, twilight; the time from the first dawn or appearance of the morning to the rising sun; and again, between the setting of the sun and the last remains of day. Papias derives the word from *creperus*: which, he says, anciently signified uncertain, doubtful, *q. d.* a dubious light. The crepusculum is usually computed to begin and end when the sun is about 18 degrees below the horizon; for then the stars of the sixth magnitude disappear in the morning, and appear in the evening. It is of longer duration in the solstices than in the equinoxes, and longer in an oblique than in a right sphere. The crepuscula are occasioned by the sun's rays refracted in our atmosphere, and reflected from the particles thereof to the eye. See TWILIGHT.

CRESCENDO. (Ital. from *crescere*, to increase.) A term in music, unknown till about the middle of the last century. Jomelli introduced the terms *crescendo* and *diminuendo* into Germany, for the gradual increase and diminution of sound.

CRE'SCENT. *a.* (from *cresco*, Latin.) Increasing; growing (*Milton*).

CRE'SCENT. *s.* (*crescens*, Latin.) The moon in her state of increase; any similitude of the moon increasing (*Dryden*).

CRESCENT, in heraldry, is a bearing in form of a half-moon. The Ottomans bear sinople, a crescent montant, argent. The crescent is frequently used as a difference in coat-armour, to distinguish it from that of a second brother, or junior family. The figure of the crescent is the Turkish symbol; or rather, is that of the city Byzantium, which bore this device from all antiquity; as appears from medals struck in honour of Augustus, Trajan, &c. Crescents are said to be adossed, when their backs or thickest parts are turned towards each other; their points looking to the sides of the shield. Crescent inverted, is that whose points look towards the bottom: turned crescents are placed like those adossed; the difference is, that all their points look to the dexter side of the shield: conturned crescents, on

the contrary, look to the sinister side; affronted or appointed crescents, are contrary to the adossed, the points looking towards each other.

CRESCENT, is also the name of a military order, instituted by Renatus of Anjou, king of Sicily, &c. in 1448; so called from the badge, or symbol thereof, a crescent of gold enamelled.

CRESCENT-SHAPED, in botany. (*lunate*, from *luna*, the moon.) Roundish, hollowed at the base with posterior angles. Subrotundum basi excavatum, angulis posticis notatum.—Applied to leaves and spikes; as in acrostichum pectinatum. The diminutive lunulate is applied to the keel of the flower in polygala myrtifolia. Moon-shaped is absurd, and mooned still worse. If the terms lunate, lunulate, or crescent-shaped be objected to, we may use the periphrasis, shaped like a crescent, for any form of a leaf, &c. resembling the moon in any period of her first quarter; since this term does not occur very frequently.

CRESCENTIA. Calabash tree. A genus of the class didynamia, order angiospermia. Calyx two-parted, equal; corol gibbous; berry pedicelled, one-celled, imbedded in pulp. Two species.

1. C. cajete. A native tree of Jamaica and the Leeward Islands; height from twenty to thirty feet, branching at the top, into a large head; the leaves are wedge-lanceolate, crowded, disposed in tufts; the flowers are lateral, large, and solitary, one-petalled, of a greenish yellow hue; striped and spotted with brown, succeeded by a large fruit, with a thick skin and ligneous shell, capable of containing, when emptied of its pulp, nearly three pints. They are appropriated to various purposes; and the calabash shells are sometimes so large as to hold each two gallons of water.

2. C. cucurbitina; a native of the West Indies, is a more diminutive tree, with leaves ovate, distinct, somewhat coriaceous, not in tufts: the flowers nodding, fruit pointed. Both species may be easily propagated, but can only be reared in a hot-house.

CRE'SCIVE. *a.* (from *cresco*, Latin.) Increasing; growing (*Shakspeare*).

CRESPI (Guiseppe Maria), a painter of Bologna, born in 1665, and died in 1747. He accustomed himself to paint in a chamber properly darkened, and so contrived as to admit a ray of the sun, or the light of a flambeau, to enable him to give a greater roundness and relief to his paintings, by a nice observation of the force of natural light and shadow. (*Watkins*).

CRESS, in botany. See LEPIDIUM.

CRESS (Indian). See TROPÆOLUM.

CRESS (Sciatica). See IBERIS.

CRESS (Spanish, or Rocket). See VELLA.

CRESS (Swine's). See COCHLEARIA.

CRESS (Wall). See TURRITIS.

CRESS (Warted). See COCHLEARIA.

CRESS (Water). See SISIMBRIUM and NASTURTIUM.

CRESS (Winter). See ERISYMUM.

CRESSA, in botany, a genus of the class pentandria, order pentagynia. Calyx five-leaved; corol salver-shaped, filaments sitting on the tribe; capsule two-valved, one or four-seeded. Two species; one a native of Crete, the other of the East Indies.

CRE'SSET. *s.* (*croissette*, French.) A great light set upon a beacon, light-house, or watch-tower (*Milton*).

CRESSY, a village of France, in the department of the Straits of Calais, and late province of Picardy. It is memorable in history for a bloody battle fought, and a glorious victory obtained here in 1346, by the English, under king Edward III. and the Black Prince, over the French, in the time of Philip of Valois, when the flower of the French nobility were slain. It is 13 miles N. of Abbeville. Lat. 50. 20 N. Lon. 1. 55 E.

CREST, in armoury, the top part of the armour for the head, mounting over the helmet, in manner of a comb, or tuft of a cock, deriving its name from crista, a cock's comb. The crest was for the most part made of feathers, or the hair of horses' tails or manes. The soldiers took great pride in adorning them. In most of the old monuments we find the crest represented, not much unlike those on the tops of our modern head-pieces: but whatever the common soldiers had, those of the officers were usually wrought in gold or silver, and the plumes of a larger size, quite across the helmet; and some wore two, three, or four together of these plumes.

CREST, in heraldry, the uppermost part of an armoury, or that part of the cask or helmet next to the mantle. Guillim says, the crest, or cognizance, claims the highest place, being seated on the most eminent part of the helmet; yet so as to admit of an interposition of some escrol, wreathe, chapeau, crown, &c. The crest is esteemed a greater mark of nobility than the armoury, being borne at tournaments, to which none were admitted till such time as they had given proof of their nobility: sometimes it serves to distinguish the several branches of a family; and it has served, on occasion, as a distinguishing badge of factions: sometimes the crest is taken for the device; but more usually is formed of some piece of the arms. Families that exchange arms do not change their crest.

CREST denotes, likewise, any tuft or ornament on the head; and the word is used figuratively to signify pride, spirit, fire.

CRE'STED. *a.* (from *crest*; *cristatus*, Lat.) 1. Adorned with a plume or crest (*Milton*). 2. Wearing a comb (*Dryden*).

CRESTED. (*cristatus*.) In botany, having an appendage like a crest or tuft; as the flower of polygala and some anthers.

CREST-FALLEN. *a.* (*crest* and *fall*.) Dejected; sunk; heartless; spiritless (*Howel*).

CREST-FALLEN: In the manage, a term applied to a horse when that part of him running from the withers to the ears, and upon which the mane grows, is impoverished and wasted, from the natural prominence of its beautiful curve, to a state of hollowness or indentation. This is generally accompanied by

a total emaciation, produced by very bad support, or neglect under different degrees of disease. The firmness and corresponding curve of the crest is almost invariably a tolerable criterion of the health and condition of the horse; and a judicious inspector seldom omits this part of the examination. If the flesh upon the crest be firm, solid, and not flabbily soft, or fluctuating, it is a good sign of constitutional strength; but a horse having a low, bare, indented crest, will always have a poor, weak, and impoverished appearance. This defect, however, proceeds more frequently from penurious keep than from any defect in nature, and may always be expeditiously remedied by liberal nourishment.

CRE'STLESS. *a.* (from *crest.*) Not dignified with coat-armour (*Shakspeare*).

CRETA. Chalk. In oryctology, a genus of the class earths, order calcareous: consisting of carbonat of lime and carbonic acid gass, and a few extraneous substances; friable, efferverscing and nearly totally soluble in acids; calcining in the fire, but not vitrifying in the strongest degree of heat, unless the oxygen of the carbonic acid be very forcibly prevented from escaping. Eight species.

1 C. conchacea. Calx conchacea; humus conchacea. Containing small and very minute shells, not cohering, not soiling the fingers, without lustre. Found on the maritime parts of Etruria, Saxony, and Wirtemberg, rarely covered with mould.

2. C. granulata. Calx testacea, or testaceous chalk. Consisting of rounded, quite glabrous milk-white opaque granulations, which do not stain the fingers. Found on the shores of Ascension Island, where it serves as a nidus for the testudo midas, or largest tortoise of the genus, to lay its eggs in.

It is composed of shells and corals, comminuted by the waves of the sea, or of the harder calcareous substances worn down and rubbed together by the torrents of rivers.

3. C. testacea. Not widely differing from the former, except in not possessing such defined granulations. Produced by comminuted shells, without lustre, not staining the fingers. Found on the coasts of England and France.

4. C. pulverulenta. Native lime. Reducible to dust, without lustre, rough to the touch, staining the fingers. Found near Bath; white; when mixed with a little oxyd of iron it becomes yellowish.

5. C. squamosa. Mineral agaric; with somewhat greasy, snow-white, shining scales, which soil the fingers. Found near Gera; very friable; falling to dust in water; adheres to the tongue, and is entirely soluble in nitrous acid; colour sometimes silvery-white.

6. C. farinacea. Soft carbonat of lime. Mineral agaric. A variation, therefore, of the former, or of the latter; the whole of which three might better, perhaps, be arranged under one species. Farinaceous, loosely cohering, floating, soiling the fingers. Found in Britain, and various other parts in the clefts of rocks, or the bottom of lakes, or calcareous mountains. It is formed of more compact particles than spec. 5; is exceedingly brittle, and reducible to dust; colour white, reddish, or yellowish.

7. C. scriptoria. Common chalk. Soft carbonat of lime. Solid, rough, slightly adhering to the tongue, without lustre, opaque, staining the fingers, breaking into indeterminate fragments. Found in large strata in various parts of Britain, Germany, France, and Sweden; particularly on some sea-coasts; often containing flints, and the vestiges of echini and other shells; colour generally white; rarely greyish; feels rather rough to the touch, and effervesces strongly with acids: contains—

Carbonat of lime	95
Alumine	2
Water	3
	100

8. C. ganil. Arenaceous limestone. Solid, hardish, brittle, a little shining and transparent. Found on the shores of Rhagberg, a small island on the coast of Antrim, and at Codrilla, on the west side of Vesuvius; yellowish-white. In the lump it cannot be easily broken; but in small pieces it fritters against the fingers; phosphoresces when scraped in the dark with a knife. Specific gravity 2,742. Contains carbonic acid 47.

CRETA PRÆPARATA. Prepared chalk is a carbonat of lime, and possesses antacid qualities: it is exhibited in form of electuary, mixture, or bolus, in pyrosis, cardialgia, acidities of the primæ viæ, rhachitis, crusta lactea, &c. and is an antidote against white arsenic.

CRETA'CEOUS ACID. Fixed air. See CARBONIC ACID.

CRETA'CEOUS. *a.* (*creta*, chalk, Latin.) 1. Having the qualities of chalk (*Grew.*) 2. Abounding with chalk (*Philips*).

CRE'TATED. *a.* (*cretatus*, Latin.) Rubbed with chalk.

CRETE, a celebrated island in the Mediterranean, now known by the name of CANDIA. Nations are effaced from the earth like the monuments of their power, and after the revolutions of several ages, we can scarce trace in their posterity any remains of their ancient character. Some of them exist longer, others shorter; but we may almost always calculate the period of their duration by the excellence of their laws, and the fidelity with which they support and obey them. The republic of Crete, being established on a solid basis, knew no foreign master for a period of ten centuries. She bravely repelled the attacks of those princes who attempted to enslave her. At length the time arrived when the warlike and victorious Romans aspired to the empire of the world, and would suffer none but their subjects or slaves to inhabit within the reach of their arms. Florus does not scruple to acknowledge, that the Romans had no other motives for invading Crete but the ambitious desire of subduing the renowned native country of Jupiter. From the Romans, Crete passed into the hands of Boniface, marquis of

Montserrat, who, being more covetous of gold than glory, sold it to the Venetians in 1194, under whom it assumed the name of Candia.

CRETE (Dittany of). See DICTAMNUS CRETICUS.

CRETIO, in antiquity, a certain number of days allowed the heir to consider whether he would act as heir to the deceased or not; after which time, if he did not act, he was excluded from the estate.

CRE'VICE. *s.* (from *crever*, French.) A crack; a cleft; a narrow opening (*Addison*).

To CRE'VICE. *v. a.* (from the noun.) To crack; to flaw (*Wotton*).

CREUSA. The celebrated of this name are the following: 1. A daughter of Creon, king of Corinth. As she was going to marry Jason, who had divorced Medea, she put on a poisoned garment, which immediately set her body on fire, and she expired in the most excruciating torments. She had received this gown as a gift from Medea, who wished to take that revenge upon the infidelity of Jason. Some call her Glauce. (*Ovid*). 2. A daughter of Priam, king of Troy, by Hecuba. She married Æneas, by whom she had some children, among whom was Ascanius. When Troy was taken, she fled in the night with her husband; but they were separated in the midst of the tumult, and Æneas could not recover her, nor hear where she was. Cybele saved her, and carried her to her temple, of which she became priestess; according to the relation of Virgil, who makes Creusa appear to her husband in a vision, while he was seeking her in the tumult of war. She predicted to Æneas the calamities that attended him, the fame he should acquire when he came to Italy, and his consequent marriage with a princess of the country.

CREUSE, a department of France, which takes its name from the river Creuse, which passes through it. Gueret is the capital.

CREUSE (Little), a river of France, which runs into the Creuse, near Fresselines.

CREUSE, a river of France, which rises about eight miles south of Felletin, crosses the department to which it gives name, and the department of the Indre, separates the department of the Indre and Loire from that of Vienne, till about five miles east from La Haye it loses itself in the river Vienne.

CREUX. (from the French, signifying a *hollow*, or *cavity*.) A term in sculpture, which stands opposed to relievo; the lines and figures in this being sunk within the face or plane of the substance on which they are cut, while in that they appear prominent beyond the face.

CREW. *s.* (probably from cnuð, Saxon.) 1. A company of people associated for any purpose (*Spenser*). 2. The company of a ship (*Dryden*.)

CREW. The preterite of *crow*.

CRE'WEL. *s.* (*klewel*, Dutch.) Yarn twisted, and wound on a knot or ball (*Walton*).

CREWKERNE, a town in Somersetshire, with a market on Saturdays; inhabitants 2576 Lat. 50. 50 N. Lon. 3. 0 W.

CRIB. *s.* (cnybbe, Saxon.) 1. The rack or manger of a stable (*Shakspeare*). 2. The stall or cabin of an ox. 3. A small habitation; a cottage (*Shakspeare*).

To CRIB. *v. a.* (from the noun.) To shut up in a narrow habitation; to cage (*Shaksp.*)

CRIBBAGE, a game at cards, differing from all others by its immense variety of chances, and generally reckoned useful to instruct young people in the science of calculation. It is played several ways, by two, three, or four persons, with five, six, or sometimes eight cards: the rules also vary a little in different companies; but the following are those most generally allowed:—

The dealer may discover his own cards, though if he shew any of the adversary's, that adversary is entitled to mark 2 points, and also at liberty to call a fresh deal.

Should too many cards be dealt to either party, the non-dealer may score 2 points, and likewise demand another deal, upon the error being detected previous to taking up the cards: but if he do not wish a new deal, in that case the extra cards must be drawn; and when any player is observed to have in hand more than the proper number of cards, then the opponent shall set up 4 points, and may also call a new deal.

If any player meddle with the cards after dealing, till the period of cutting them for the turn-up card, then his opponent shall score 2 points.

When any player scores more than entitled to, the other party should not only put him back as many points as are overmarked, but likewise score the same extra number for his own game.

Should either party meddle even with his own pegs unnecessarily, the opponent may take 2 points, and if any one takes out his front peg, he must place the same back behind the other; though when any are misplaced by accident, a by-stander should replace the same according to the best of his judgment, but never otherwise interfere.

When any player miscalculates, or neglects to set up what he is entitled to, the adversary is, in some companies, allowed to take the points so omitted; but in others that is not done, the inattentive person being only prohibited from afterwards scoring them.

Each player may place his own cards, when done with, on the pack.

In five-card cribbage, the cards are to be dealt one by one alternately, but when played with six cards, then it is customary to give three, and if with eight cards, four at a time.

The non-dealer at the commencement of the game in five-card cribbage scores 3 points, called taking three for last, but in six and eight-card cribbage that is not to be done.

Some parties permit flushes in play to be reckoned, when three or more cards of a suit are laid down successively, that is, the person playing the third card reckons 3, and the player laying down a fourth of the same suit scores 4, and so on if five, six, or more can be played.

CRIBBAGE.

Cribbage boards are so universally known, that it is unnecessary to describe them: and the 61 points or holes marked thereon make the game. The party cutting the lowest card deals, after which each player is first to lay out two of the five cards for the crib, which always belongs to the dealer; next the adversary cuts the remainder of the pack, and the dealer turns up and lays on the crib the uppermost card, for which, if a knave, he marks 2 points. The card turned up is to be reckoned by both parties, whether in showing their hands or crib. After laying out and cutting as above mentioned, the eldest hand plays a card which the other endeavours to pair, or to find one, the points of which, reckoned with the first, will make 15; then the non-dealer plays another card, trying to make a pair, pair royal, sequence, flush where allowed of, or 15, provided the cards already played have not exceeded that number, and so on alternately till the points of the cards played make 31, or the nearest possible number under that.

When the party whose turn it may be to play cannot produce a card that will make 31, or come in under that number, he then says, Go, to his antagonist, who thereupon is entitled to score 1, and must play any card or cards he has that will make 31 or under; and if he can make exactly 31, then is to take two points; and besides, the last player has often opportunities to make pairs, or sequences. Such cards as remain after this are not to be played; but each party having, during the play, scored his points gained, in the manner as directed before, proceeds, the non-dealer first, then the dealer, to count and take for his hand and crib as follows, reckoning the cards every way they can possibly be varied, and always including the turned-up card.

For every 15 . . . . 2 points.
Pair, or two of a sort . 2 points.
Pair-royal, or three of a sort . 6 points.
Double pair-royal or four ditto 12 points.
Sequence of any suits, according to the number.
Flushes according to the number.

Knave, or noddy, of the same suit as turned up, 1 point; but when turned up it is not to be reckoned again, nor is any thing to be taken for it when played.

Three cards of the same suit in hand, or four in crib, usually entitle the player to reckon that number as a flush, and also one more when the turned-up card happens to be of the same suit; but among professed gamesters it is not customary to allow flushes in crib, unless all the cards including that turned up, are of a similar suit.

In laying out cards for the crib, it is always requisite that every player should consider not only his own hand, but also to whom the crib belongs, as well as the state of the game; for what might be proper in one situation, would be highly imprudent in another. When any player possesses a pair-royal, it is generally advisable to lay out the other cards for either crib, unless those others consist of two fives, a deuce and trois, five and six, seven and eight, fifth and any tenth card, or the crib belonging to the adversary, or the game almost finished. A player, when he does not thereby materially injure his hand, should, for his own crib, lay out close cards, in hopes of making a sequence, or two of a suit, in expectation of a flush, or any that of themselves amount to 15, or such as, reckoned with others, will make that number, except when the antagonist is nearly up, and it may be expedient to keep such cards that probably might prevent him from gaining at play. The direct contrary method should be pursued in respect to the adversary's crib, which each person should endeavour to baulk, by laying out those cards that are not likely to prove of advantage, unless at such a stage of the game, when it may be of consequence to keep in hand cards likely to tell in play, or when the non-dealer would either be out by his hand, or has reasons for judging the crib of little moment. A king is the best card to baulk a crib, as none can form a sequence beyond it, except in some companies where queen, king, ace are allowed as a sequence; and either a king, or queen, with an ace, six, seven, eight, or nine, are good ones to put out. Low cards are generally the most likely to gain at play. Flushes and sequences, particularly if they are also flushes, are for the most part eligible hands, as thereby the player is often enabled either to assist his own crib, or baulk that of the opponent; to whom a knave should never be given, if with propriety it can be retained. Sequences in play need not be laid down in order; it is sufficient that the cards on the table will form a sequence without any other one intervening; as for instance, suppose a six first played, then a four, and afterwards a trois, if a deuce follows, it will make sequence of three; then if a five, it will be a sequence of five; and if an ace or seven succeeds the five, a sequence of six; though should a ten, or any other card that will not run on regular, be played as the fourth, the sequence then will be totally prevented.

Twenty-nine is the greatest possible number that can be gained by the shew of any hand, or crib, either in five or six-card cribbage, and is composed of three fives and a knave, with a fourth five, of the same suit as the knave, turned up; this very seldom happens; but twenty-four is not an uncommon number, and may be formed of four threes and a nine, or two fours, one five, and two sixes; and some other combinations that a little experience will point out.

The almost endless variety in cribbage renders it impossible to give, in a small compass, sufficient directions for learners to put out, retain, or play their cards to the best advantage in all the different situations of the game; experience and attention combined with calculation will soon do the whole. The chances are often so extraordinary and unexpected, that even between skilful gamesters it is possible at five-card cribbage, when the adversary is 56,

for a lucky player, who had not previously made a single hole, to be more than up in two deals, his opponent getting no further than 60 in that time; and in four-hand cribbage a case may occur, wherein none of the parties hold a single point in hand, and yet the dealer and his friend, with the assistance of knave turned up, may make 61 by play in one deal, while their adversaries only get 24; and though these particular games, as stated hereafter, may not happen of many years, yet others nearly similar may now and then be met with.

Suppose A to be 56, and B, whose turn it is to deal, not having gained a single point, gives A one six, two sevens, a three, and a four, and to himself three sixes, a deuce, and a three, he laying out the deuce and three; A the three and four to the crib, for which the turn-up card proves another three. A then plays a seven, B a six, making 13; then A another six, making 19, and scores two for a pair; B a third six, making 25, and a pair royal, for which he scores 6

A not being able to come in, B plays the fourth six, making a double pair royal, with 2 for 31 14

A shews and marks 2 for the pair of sevens in his hand; B shews and sets up 12 for his hand, and 17 for crib 29

Second deal, A gives B three, four, and five of the same suit, with any two tenth cards; and to himself seven, eight, nine, and likewise two tenth cards; each person laying out his two tenth cards for the crib, and a three again turned up. B plays a four, A an eight, making 12, B a three, 15, and scores 2

A follows with the nine, making 24, B has five, 29, and the end hole 1

And scores also for his hand 13

Making in all four more than game .. 65

In the other case A and B play against C and D. A deals to every one a three, four, six, seven, and any tenth card, which last mentioned each, to play judiciously, should put out for the crib; then suppose a knave turned up, for

which A and B score		2
C begins with a four.		
B pairs the same and sets up		2
D makes a pair-royal	6	
A a double pair-royal		12
C then follows with a three.		
B pairs that also		2
D makes another pair-royal	6	
A the double ditto, and end hole ..		13
C goes on with a seven, which		
B likewise pairs		2
D plays the third seven	6	
A the fourth seven, and end hole again		13
C now plays his six.		
B pairs it		2
D makes the pair-royal again	6	
A the double ditto, and end hole ..		13
	—	—
	24	61

Odds of the game.

The chances of points in a hand are calculated at more than 4, and under 5; and those to be gained in play are reckoned 2 to the dealer, and 1 to the adversary, making in all about 6 on the average, throughout the game; and the probability of those in the crib are estimated at 5; so that each player ought to make 16 in two deals, and onward in the same proportion to the end of the game; by which it appears that the first dealer has rather the advantage, supposing the cards to run equal, and the players likewise equally matched in skill. By attending to the above calculation any player may judge whether he be at home or not, and thereby play his game accordingly, either by making a push when he is behind and holds good cards, or by endeavouring to baulk the opponent when his hand proves indifferent.

In favour of the dealer.

Each party being even	5 holes going up, is	6 to 4
	at 10 holes each	12—11
	15 each	7— 4
	20 each	6— 4
	25 each	11—10
	30 each	9— 5
	35 each	7— 6
	40 each	10— 9
	45 each	12— 8
	50 each	5— 2
	55 each	21—20
	60 each	2— 1
When the dealer wants	3 and his opponent 4	5— 4

In all situations of the game, till within 15 of the end, when the dealer is 5 points a head .... 3— 1
But when between 15 of the end .... 8— 1
And if the dealer wants 6, and the adversary 11 .... 10— 1
Should the dealer be 10 a head, it is 4 or .... 5— 1
And near the end of the game, 10 or .. 12— 1
When the dealer wants 16 and the antagonist 11 .... 21—20

Against the dealer.

Both players being even at	56 holes each ..	7 to 5
	57	7— 4
	58	3— 2

If the dealer want 20 and his opponent 17 .... 5— 4
When the dealer is 5 points behind, previous to turning the top of the board .... 6— 5
When he is 31, and the antagonist 36 6— 4
When 36, and the adversary 41 ...... 7— 4

Even betting.

When at 59 holes each player.
In all points of the game, till within 20 of the end, if the non-dealer is 3 a head.
The dealer wanting 14, and his antagonist 9
Ditto .... 11, ditto 7

Three or four-hand cribbage differs only from the preceding; as the parties put out but one card each to the crib, and when 31, or near as

can be, have been made, then the next eldest hand leads, and the players go on again, in rotation, with any remaining cards, till all are played out, before they proceed to shew. For three-hand cribbage triangular boards are used.

A sort of three-hand cribbage is sometimes played wherein one person sits out, not each game, but each deal, in rotation. In this the first dealer generally wins.

Six-card cribbage varies from that played with five, as the players (always only two) commence on an equality, without scoring any points for last, retain four cards in hand, and all the cards are to be played out, as in three and four-hand cribbage with five cards. At this game it is of advantage to the last player to keep as close cards as possible, in hopes of coming in for 15, a sequence, or pair, besides the end hole or 31. The first dealer is reckoned to have some trifling advantage, and each player may, on the average, expect to make 25 points in every two deals. The first non-dealer is considered to have a preference, when he gains 10 or more the first-hand, and the dealer not making more than his average number.

Eight-card cribbage is sometimes played; but very seldom.

These games of three and four-hand cribbage, and those of six or eight cards, are easier than that of five cards by two persons, and consequently are not near so much in vogue with professed gamesters.

Some ingenious people in London invented a game of chance they styled playing at cribbage by hackney coaches; that is, two persons seating themselves at a window in some great thoroughfare street, one would take all the coaches from the right, the other from the left: the figures on the doors of the carriages were reckoned as cards in shew, and every man or boy that happened to sit, stand, or hold at the back of any of them, was called a Noddy, and 1 scored for each.

CRI'BBLE. *s.* (*cribrum*, Latin.) A corn sieve.

CRIBRARIA. In botany, a genus of the class cryptogamia, order fungi. Case furnished with a double membrane; the outer thin and fugacious, the inner reticulate; seeds without filaments, ejected through the foramens.

CRIBRA'TION. *s.* (*cribro*, Latin.) The act of sifting, or separating by a sieve.

CRIBRIFORM BONE. (*cribriformis*; from *cribrum*, a sieve, and *forma*, likeness; because it is perforated like a sieve). The ethmoid bone is so called. See ETHMOID BONE.

CRICELASIA, formed of κρικος, ring, and ελαυνω, I drive, among the Greeks, the exercise of rolling the circle or trochus. It seems to have differed but little from the present boyish exercise of driving a hoop: but was said to render the limbs pliable, and strengthen weak nerves.

CRICHTON (James), a celebrated Scotchman of the 16th century, of whom so many wonderful things are recorded as to have procured him the name of "the admirable Crichton." He was born about 1560 in the county of Perth, and by his mother's side was descended from the ancient Scottish kings. He was educated at St. Andrews, and it is said that by the time he was 20 he had gone through the whole circle of sciences. He was besides an accomplished gentleman. He then went on his travels, and at Paris he challenged all the learned men to dispute with him in any art or science, and in any language ancient or modern. They say he managed this disputation with great success from nine in the morning till six at night, in consequence of which the professors presented him with a diamond ring and a purse of gold. The next day he went to a tilting match, and in presence of the court carried the prize fifteen times successively. From thence he went to Rome, where he disputed in the presence of the pope and the cardinals, but Boccalini seemed to treat him with contempt, and intimates that he left Rome in disgust. He then went to Venice, where he was well entertained by Aldus Manutius, and other learned men. He held several disputations in that city; and obtained an entire victory over the followers of Aristotle. We next find him at Mantua, where he slew a formidable gladiator, who was become odious from the number of persons whom he had killed in combats. Here also he composed a comedy, and performed in it himself. The duke of Mantua was so pleased with him that he appointed him preceptor to his son, who was a very licentious prince. This appointment, however, proved fatal to him; for one night as he was going through the streets in carnival time, he was attacked by six men in masks. He beat them off, and disarmed their leader, who proved to be his pupil. Crichton presented him his own sword, on which the wretch instantly plunged it into his heart. Such is the story told by his biographers one after another; although it appears too extravagant to obtain complete assent. His death is placed by some in the 32d, by others in the 22d year of his age (*Watkins*).

CRICK. *s.* (from *cricco*, Ital.) 1. The noise of a door. 2. (from cɲyce, Saxon, a stake.) A painful stiffness in the neck.

CRICKET. In entomology. See GRYLLUS.

CRICKET. An active or manly game played with bats and ball, peculiar, or nearly so, to our own country. The derivation of the term in this sense is uncertain. Dr. Johnson deduces it from the Saxon cɲyce, a stick, and it is not improbable that sticks were at first used instead of bats; and it is some proof that the term is of Saxon descent, since there is no continental tongue or dialect in which it is to be found as descriptive of an exercise or pastime. We are ignorant of the origin of this pastime, but know that it has been of very long standing in our own country, and that in former times as well as at present the stake played for was often to a considerable amount.

The number of the party on each side is eleven, who alternately take the innings, and alternately the bowling and watching; and the essence of the game consists on the one side in

an endeavour to knock down the wickets by repeated throws of the ball from one wicket to the other, or in endeavours to catch the ball when struck by the batters who defend the wickets against its attack; and on the other by striking the ball in such a manner as not to endanger its being caught, and to such a distance, as to allow the batters to run and exchange wickets before the ball is returned to either of the bowlers, so that either of the wickets may be knocked down while one of the batters is absent from it at more than the distance of the length of his bat. Every run from wicket to wicket constitutes a notch, and the game is decided by the greatest number of notches obtained by the one party over the other upon two innings of both. The following are the laws of the game as settled by the cricket-club at the Artillery ground in 1744, and since corrected by the Mary-le-bone club.

The ball must weigh not less than five ounces and a half, and not more than five ounces and three quarters. At the beginning of each innings either party may call for a new ball.

The bat must not exceed four inches and one quarter in the widest part.

The stumps, which are three, must be twenty-four inches out of the ground, the bail seven inches in length.

The bowling crease must be in a line with the stumps, three feet in length, with a return crease.

The popping crease must be three feet ten inches from the wicket, and parallel to it.

The wickets must be opposite to each other, at the distance of twenty-two yards.

The wicket-keeper must stand at a reasonable distance behind the wicket and not move till the ball is out of the bowler's hand, nor by any noise, incommode the striker; and, if his hands, knees, feet or head, be over or before the wicket though the ball hit it, the player shall not be out.

The party which goes from home has the choice of the innings, and the pitching of the wickets, which must be pitched within thirty yards of a centre fixed by the adversaries.

When the parties meet at a third place, the bowlers must cast a piece of money for the pitching of the wickets, and the choice of going in.

Neither party, during a match, without the consent of the other, can alter the ground by rolling, watering, covering, mowing, or beating. This rule, however, is not meant to prevent the striker from beating the ground occasionally with his bat, near where he stands, during the innings, or to prevent the bowler from filling up occasional holes, watering his ground, or using sawdust, &c. when the ground is wet.

The bowler must not deliver the ball with one foot behind the bowling-crease, and within the return-crease, and bowl 4 or 6 balls before he changes wickets, which he is allowed to do but once in the same innings.

He may order a striker, at his wicket, to stand on which side of it he pleases.

The striker is out; 1. if the bail be bowled off, or the stump bowled out of the ground; 2. if the ball, from a stroke over or under his bat, or upon his hand (but not wrists), is held before it touches the ground, although it be hugged to the body of the catcher; 3. if in striking, or at any other time while the ball is in play, both his feet are over the popping-crease and his wicket put down; except his bat be grounded within it; 4. if in striking the ball he hit down his wicket; 5. if under pretence of running a notch, or otherwise, either of the strikers prevent a ball from being caught, in which last case the striker of the ball is out; 6. if the ball be struck up, and either wilfully strike it again; 7. if in running a notch, the wicket is struck down by a throw, or with the ball in hand, before his foot, hand, or bat, is grounded over the popping-crease: but, if the bail be off, the stump must be struck out of the ground; 8. if the striker touch or take up his ball while in play, unless at the request of the opposite party; 9. if with his foot or leg he stop the ball, which the bowler, in the opinion of the umpire at the bowler's wicket shall have pitched in a straight line to the wicket, and would have hit it.

If the players have crossed each other, he that runs for the wicket which is put down, is out; if they have not crossed, he that has left the wicket which is put down, is out.

When a ball be caught no notch to be reckoned.

When a striker is run out, the notch run for is not to be reckoned.

When the ball has been in the bowler's, or wicket-keeper's hands, it is considered as no longer in play, and the strikers need not keep within their ground till the umpire has called *play*; but, if the player go out of his ground with an intent to run before the ball is delivered, the bowler may put him out.

If the striker be hurt, he may retire from his wicket, and have his innings at any time in that innings.

If a striker be hurt, some other person may be allowed to stand out for him, but not go in.

If any person stop the ball with his hat, the ball is to be considered as dead, and the opposite party is allowed to add five notches to their score; if any score be run, the runners are to have five in all.

If the ball be struck up, the striker may guard his wicket either with his bat or his body.

In single wicket matches, if the striker move out of his ground to strike the ball, he shall be allowed no notch for such stroke.

Not out if the striker hit the opposite wicket, and his partner off his guard.

The umpires are sole judges of fair and unfair play, and all disputes must be determined by them; each at his own wicket; but in case of a catch, which the umpire at the wicket cannot see sufficiently to decide upon, he may apply to the other umpire, whose opinion is conclusive.

They shall allow two minutes for each man to come in, and fifteen minutes between each innings; when the umpire shall call *play*, the party refusing to play shall lose the match.

They are not to order a player out, unless appealed to by their adversaries.

But, if the bowler's foot be not behind the bowling-crease, and within the return-crease, when he delivers the ball, they must, unasked, call *no ball.*

If the striker run a short notch, the umpire must call *no notch.*

The umpire at the bowler's wicket shall be first applied to, to decide on all catches.

The umpires are not to be changed during the match, but by the consent of both parties.

Bets.—If the notches of one player be laid against another, the bets depend on the first innings, unless otherwise specified.

If the bets be made upon both innings, and one party beat the other in one innings, the notches in the first innings shall determine the bet.

But, if the other party go in a second time, then the bet must be determined by the number on the score.

CRICKHOWELL, a town in Brecknockshire, with a market on Thursdays. Lat. 51. 49 N. Lon. 3. 57 W.

CRICKLADE, a borough in Wilts, the inhabitants of which being convicted of corruption in 1782, those electors who had accepted bribes were disqualified, and the right of voting in future extended to the freeholders of the hundreds of Highworth, Staple, Cricklade, King's bridge, and Malmesbury. The market here is on Saturdays: the number of inhabitants in Highworth, Cricklade, and Staple, about 9500. Cricklade is almost surrounded by the Thames. Lat. 51. 38 N. Lon. 1. 50 W.

CRICO, (from κρικος, a ring, whence cricos means in Hippocrates the cricoid or annular cartilages which form the aspera arteria). Crico is hence a frequent first part of compound terms in anatomy. Hence

CRICO-ARYTÆNOIDEUS LATERALIS. A muscle of the glottis, that opens the rima by pulling the ligaments from each other.

CRICO-ARYTÆNOIDEUS POSTICUS. A muscle of the glottis, that opens the rima glottidis a little; and by pulling back the arytænoid cartilage, stretches the ligament so as to make it tense.

CRICO-PHARYNGEUS. See CONSTRICTOR PHARYNGIS INFERIOR.

CRICO-THYROIDEUS. The last of the second layer of muscles between the os hyoides and trunk, that pulls forwards and depresses the thyroid cartilage, or elevates and draws backwards the cricoid cartilage.

CRICOID CARTILAGES. (*cricoideus*, κρικοειδης; from κρικος, and ειδος, resemblance). The round ring-like cartilages of the larynx.

CRICOS. CRICUS. (κρικος.) The trachea or windpipe.

CRIER. *s.* (from *cry.*) The officer whose business is to cry or make proclamation (*Dry.*)

CRIM-TARTARS, a people of Asia, so called because they originally came from Crimea. They rove from place to place in search of pastures, their houses being drawn on carts. There are a great number of them about Astracan, to which place they flock in the winter-time; but they are not permitted to enter the city: for this reason, they erect huts up and down in the open fields. They are generally of small stature, with large faces, little eyes, and an olive complexion.

CRIM TARTARY, or CRIMEA, called by the Russians Kirim Athasi, is the ancient Taurica Chersonesus; it is a peninsula lying in the Black sea, by which it is bounded on the W. and S. on the E. by Circassia, and on the N. by the Palus Mæotis, or Sea of Azoph. It is situated between 44 and 46 deg. of N. lat. and between 40 and 44 deg. of E. lon. The Chan of the Crim Tartars is greatly dependent on the Turks, whom he is obliged to furnish with 30,000 men when required. The Tartars live generally by robbing. The Russians ravaged this country in the years 1738 and 1739, but did not think it worth keeping. The chief trade of the Tartars is in slaves; and in exchange for these, they receive rice, coffee, raisins, dates, and clothing.

CRIM, CREMENDA, or SOLAT, was formerly the capital of the above peninsula; it is seated in a fertile plain, on the river Gerukesu, 24 miles N.W. of Kaffa.

CRIME, a breach or transgression of a law, or an action contrary to the purport of a law, either natural or divine, civil or ecclesiastic; to which a penalty is annexed. The term crime includes in it the idea of determination and design formed to do an injury. It is derived from the Latin *crimen*, of κρινω, *judico*, I judge.

The Romans distinguished two kinds of crimes; viz. private, which only affected particular persons; the prosecution whereof was not allowed by the law to any but those interested therein; as adultery, &c.: and public crimes; the prosecution whereof was submitted to all persons, though in no-wise immediately interested. With us, crimes are distinguished into capital; as treason, murder, robberies, &c. and common, as perjuries, &c. They are again divided into crimes cognizable by the king's judges; as those above mentioned: and such as are only cognizable in the spiritual courts, as simple fornication, &c.

The cognizance and admeasurement of crimes and punishments form in every country the code of criminal law; or, as it is more usually denominated in England, the doctrine of the pleas of the crown: so called, because the king, in whom centres the majesty of the whole community, is supposed by the law to be the person injured by every infraction of the public rights belonging to that community; and is therefore in all cases the proper prosecutor for every public offence.

The knowledge of this branch of jurisprudence, which teaches the nature, extent, and degrees of every crime, and adjusts to it its adequate and necessary penalty, is of the utmost importance to every individual in the state.

For no rank or elevation in life, no uprightness of heart, no prudence or circumspection of conduct, should tempt a man to conclude, that he may not at some time or other be deeply interested in these researches. The infirmities of the best among us, the vices and ungovernable passions of others, the instability of all human affairs, and the numberless unforeseen events which the compass of a day may bring forth, will teach us (upon a moment's reflection), that to know with precision what the laws of our country have forbidden, and the deplorable consequences to which a wilful disobedience may expose us, is a matter of universal concern.

Although in various instances we may glory in the wisdom of our laws, we shall find it somewhat difficult to justify the frequency of capital punishment inflicted (perhaps inconsiderately) by the multitude of successive independent statutes, upon crimes very different in their natures. It is a melancholy truth, that among the variety of actions which men are daily liable to commit, no less than 160 have been declared by act of parliament to be felonies without benefit of clergy; or, in other words, to be worthy of instant death. So dreadful a list, instead of diminishing, increases the number of offenders. The injured, through compassion, will often forbear to prosecute; juries, through compassion, will sometimes forget their oaths, and either acquit the guilty or mitigate the nature of the offence; and judges, through compassion, will respite one half of the convicts, and recommend them to the royal mercy. Among so many chances of escaping, the needy and hardened offender overlooks the multitude that suffer: he boldly engages in some desperate attempt to relieve his wants or supply his vices; and if, unexpectedly, the hand of justice overtakes him, he deems himself peculiarly unfortunate in falling at last a sacrifice to those laws which long impunity has taught him to contemn.

In distinguishing between words often esteemed synonymous, we may remark that actions contrary to the precepts of religion are called *sins*; actions contrary to the principles of morals are called *vices*; and actions contrary to the laws of the state are called *crimes*. Consistently with this Gibbon says, " a *sin*, a *vice*, a *crime*, are the objects of theology, ethics, and jurisprudence."

CRI'MEFUL. *a.* (from *crime* and *full.*) Wicked; criminal (*Shakspeare*).

CRI'MELESS. *a.* (from *crime.*) Innocent; free from crime (*Shakspeare*).

CRI'MINAL. *a.* (from *crime.*) 1. Faulty; contrary to right; contrary to duty; contrary to law (*Spenser*). 2. Guilty; tainted with crime (*Rogers*). 3. Not civil; as, a *criminal* prosecution.

CRI'MINAL. *s.* (from *crime.*) 1. A man accused (*Dryden*). 2. A man guilty of a crime (*Bacon*).

CRI'MINALLY. *ad.* (from *criminal.*) Not innocently; wickedly; guiltily (*Rogers*).

CRI'MINALNESS. *s.* (from *criminal.*) Guiltiness; want of innocence.

CRIMINA'TION. *s.* (*criminatio*, Latin.) The act of accusing; accusation; arraignment.

CRI'MINATORY. *a.* (from *crimina*, Lat.) Relating to accusation; accusing; censorious.

CRI'MINOUS. *a.* (*criminosus*, Latin.) Wicked; iniquitous; enormously guilty (*Hammond*).

CRI'MINOUSLY. *ad.* Enormously; very wickedly (*Hammond*).

CRI'MINOUSNESS. *s.* (from *criminous.*) Wickedness; guilt; crime (*K. Charles*).

CRI'MOSIN. *a.* (*crimosino*, Ital.) A species of red colour tinged with blue (*Spenser*).

CRIMP. *a.* (from *crumble*, or *crimble.*) 1. Friable; brittle; easily crumbled (*Philips*). 2. Not consistent; not forcible: a low cant word (*Arbuthnot*).

To CRI'MPLE. *v. a.* (from *crumple.*) To contract; to corrugate (*Wiseman*).

CRI'MSON. *s.* (*crimosino*, Italian.) 1. Red, somewhat darkened with blue (*Boyle*). 2. Red in general (*Shakspeare*).

CRIMSON, is one of the seven red colours of the dyers. See DYEING.

CRIMSON GRASS VETCH. See LATHYRUS.

To CRI'MSON. *v. a.* (from the noun.) To die with crimson (*Shakspeare*).

CRI'NCUM. *s.* (a cant word.) A cramp; a contraction; whimsy (*Hudibras*).

To CRINGE. *v. a.* (from *kriechen*, Germ.) To draw together; to contract (*Shakspeare*).

To CRINGE. *v. n.* To bow; to pay court; to fawn; to flatter (*Arbuthnot*).

CRINGE. *s.* (from the verb.) Bow; servile civility (*Philips*).

CRINI'GEROUS. *a.* (*criniger*, Latin.) Hairy; overgrown with hair.

CRINIS. (*crinis.*) The hair on the back of the head. See CAPILLUS.

CRINITE. (*crinis*, hair.) In botany. Crinitum. Hairy: diminutive crenulate (*crenulatum*). This term is also applied to the nectary in narcissus poeticus

To CRI'NKLE. *v. n.* (*crinckelen*, Dutch.) To go in and out; to run in flexures (*King*).

To CRI'NKLE. *v. a.* To mould into inequalities.

CRI'NKLE. *s.* (from the verb.) A wrinkle; a sinuosity.

CRINODENDRUM. In botany, a genus of the class monadelphia, order octandria. Calyxless; coral six-petalled, campanulate; style one; capsule one-celled, three-seeded, triangular, bursting elastically at top. A native of Chili; an ever-green branching tree, with leaves opposite, lanceolate, pointed, toothed, veined; flowers axillary, solitary, erect.

CRINONES. (*crinones*, from *crinis*, the hair). Comedones. Collections of a sebaceous fluid in the cutaneous follicles upon the face and breast, which appear like black spots, and when pressed out, look like small worms, or, as they are commonly called, maggots.

CRI'NOSE. *a.* (from *crinis*, Latin.) Hairy.

CRINO'SITY. *s.* (from *crinose.*) Hairiness.

CRINUM. In botany, a genus of the class hexandria, order monogynia. Coral su-

perior, funnel-form, half six-cleft, with a filiform tube, and spreading recurved border; the segments subulate and channelled; filaments inserted in the throat of the tube, distinct. Five species: chiefly of Asia, or South America. Elegant green-house plants, with an odoriferous smell, about two or three feet high, with large umbellate clusters of monopetalous flowers, funnel-shaped, and blue, white, or striped. They are best propagated by offsets. See Botany, Plate XXV.

CRIOCERIS. In the Fabrician system of entomology, a tribe of the coleopterous class and genus CRYPTO CEPHALUS, which see.

CRI'PPLE. *s.* (cnypel, Sax. *krepel*, Dut.) A lame man (*Dryden*).

To CRI'PPLE. *v. a.* (from the noun.) To lame; to make lame (*Addison*).

CRI'PPLENESS. *s.* (from *cripple.*) Lameness.

CRISIS. (*crisis*, κρισις; from κρινος, to judge). The sudden change of symptoms in acute febrile diseases, indicating recovery or death.

CRISIS, denotes also the point of time at which any affair comes to the height.

CRISP. *a.* (*crispus*, Latin.) 1. Curled (*Bacon*). 2. Indented; winding (*Shakspeare*). 3. Brittle; friable (*Bacon*).

To CRISP. *v. a.* (*crispo*, Latin.) 1. To curl; to contract into knots (*Sharp*). 2. To twist (*Milton*). 3. To indent; to run in and out (*Milton*).

CRISP LEAF. In botany, a curled leaf.

CRISPA'TION. *s.* (from *crisp.*) 1. The act of curling. 2. The state of being curled (*Bacon*).

CRI'SPING-PIN. *s.* (from *crisp.*) A curling-iron (*Isaiah*).

CRI'SPNESS. *s.* (from *crisp.*) Curledness.

CRI'SPY. *a.* (from *crisp.*) Curled (*Shak.*).

CRISTA GALLI. An eminence of the ethmoid bone, so called from its resemblance to a cock's comb.

CRITE'RION. *s.* (κριτηριον.) A mark by which any thing is judged of, with regard to its goodness or badness (*South*).

CRITHMUM. Camphire. A genus of the class pentandria, order digynia. Fruit oval, compressed, striate: flowers uniform; calyx entire. Two species; the one, c. maritimum, common to the sea-cliffs of our own country; the other, c. latifolium, a Teneriffe plant.

CRI'TIC. *s.* (κριτικος.) 1. A man skilled in the art of judging of literature (*Locke*). 2. An examiner; a judge (*Pope*). 3. A snarler; a carper; a caviller (*Watts*). 4. A censurer; a man apt to find fault (*Swift*).

CRI'TIC. *a.* Critical; relating to criticism (*Pope*).

CRI'TIC. *s.* 1. A critical examination; critical remarks; animadversions (*Addison*). 2. Science of criticism (*Locke*).

To CRI'TIC. *v. n.* (from the noun.) To play the critick; to criticise (*Temple*).

CRI'TICAL. *a.* (from *critic.*) 1. Exact; nicely judicious; accurate (*Stillingfleet*). 2. Relating to criticism. 3. Captious; inclined to find fault (*Shakspeare*). 4. (from *crisis.*) Comprising the time at which a great event is determined (*Brown*). 5. Decisive; nice (*Swift*).

CRITICAL DAYS. Many physicians have been of opinion, that there is something in the nature of fevers which generally determines them to be of a certain duration; and, therefore, that their terminations, whether salutary or fatal, happen at certain periods of the disease, rather than at others. These periods, which were carefully marked by Hippocrates, are called critical days. The critical days, or those on which we suppose the termination of continued fevers especially to happen, are the third, fifth, seventh, ninth, eleventh, fourteenth, seventeenth, and twentieth.

In modern days, and especially in the western and northern parts of Europe, these periodical changes do not occur with the regularity observable in the age of Hippocrates: but even among ourselves the precise alternations that take place in agues of almost every type, and the frequent recurrence of evening paroxysms of fever, can easily induce us to believe that the statements of the Coan prognosticator were perfectly true in his own day.

CRI'TICALLY. *ad.* (from *critical.*) 1. In a critical manner; exactly (*Woodward*). 2. At the exact point of time.

CRI'TICALNESS. *s.* (from *critical.*) Exactness; accuracy; nicety.

To CRI'TICISE. *v. n.* (from *critic.*) 1. To play the critick; to judge (*Dryden*). 2. To animadvert upon as faulty (*Locke*).

To CRI'TICISE. *v. a.* To censure; to pass judgment upon (*Addison*).

CRI'TICISM. *s.* (from *critic.*) 1. A standard of judging well (*Dryden*). 2. Remark; animadversion; critical observations (*Addison*).

CRITICISM. *s.* (Gr. κρινω, to judge.) 1. The act of judging. 2. A particular decision or act of judging. 3. The art of judging correctly on works of genius. The term is so general, that all arts and sciences, nay, all objects of perception, may be considered as within its sphere. Hence it is frequently limited by some qualifying addition; such as literary, philosophical, historical, moral, biblical, classical, grammatical, conjectural, musical, dramatic, &c.

The editors are indebted to a literary friend, of considerable erudition, of refined taste, and of very extensive acquirements, for the following disquisition on the subject of this article.

The faculty of mind chiefly exercised in criticism will vary according to its subject, and according to the purpose for which it is employed, whether of determining truth, utility, or beauty. The action therefore of memory, or reason, or taste, will be peculiarly required in particular cases. The subjects and purposes of criticism, however, notwithstanding their respective differences, have this point of agreement, that they require, in greater or less proportions, extensive knowledge, sound judgment, and refined sensibility.

But although criticism may be regarded as extending to every science and every object in

nature; though it may involve an examination of the merits of a machine, as well as of the theorem on which it is founded, or of the drawing by which it is represented, and may as justly apply to the moral rectitude of a proposition, or an act, as to the propriety of the style in which it is described; yet the customary use of the term confines it to the estimation of performances in the various branches of the polite and fine arts. These branches are so nearly connected, that many of the general principles of criticism are precisely the same in all. The object of such performances is to instruct, or to please, the art of judging on their suitableness to these objects resolves itself into two parts. The one, respecting truth, and the method of communicating it, has been denominated, not very properly, Historical Criticism, and may be considered under the distinctions of historical, explanatory, corrective, and scientific. The other, respecting beauty, together with the methods by which that beauty is to be conferred on a work of genius, and the principles in human nature on which that pleasure depends, has been called, with little more felicity, Philosophical Criticism. These two apply to works of art as well as of literature, though the following remarks will refer chiefly to Literary Criticism.

It may be questioned whether in this general sense, especially as far as the latter clause of the definition is concerned, we are much indebted to the ancients for the principles of philosophical criticism. The learned Mr. Harris has strenuously asserted the claim of his favourite classics to the honour of founding this science; he maintains that it was reduced into a regular system by Aristotle, with the help of the instructions he had received from his master Plato, in whose writings Mr. H. supposes that many scattered elements are to be found. But according to the explanation of this ingenious writer himself, the criticism of Aristotle consisted or a "deep and philosophical search into the primary laws and elements of good writing, as far as they could be collected from the most approved performances." (Philolog. Inquiries.) It was not founded, therefore, on an analysis of the human mind and a developement of its laws of operation, but on the dictates of his own accurate taste of the practice of the best writers. He may consequently be esteemed with justice the father of criticism, but not of the philosophy of criticism; he discovered the rules, but not the theory of the rules. In this higher sense, there are scarcely any traces of philosophical criticism among ancient authors, except a few admirable though unconnected observations in Longinus. The science, therefore, can scarcely be considered as existing, certainly not as existing in a regular and recognized form, till the early part of the last century; during the progress of which, it has been very extensively and ably investigated by the labours of the Scottish literati, particularly Hutcheson, Hume, Gerard, and, above all, lord Kaimes, whose celebrated work, Elements of Criticism, presented the first attempt toward a collection and arrangement of its principles. Since the publication of that ingenious though not unexceptionable performance, the study has been greatly improved by the writings of Burke, Campbell, Blair, Beattie, and Alison; the influence of whose works is very perceptible in the liberal tone and just notions which have been observable during the last half century in critical disquisitions. Many of Johnson's criticisms are practical examples of this science; and it is but justice to add the name of Mr. R. P. Knight as an ingenious and learned theorist. This science has not been very diligently studied on the continent; but from its close connexion with the philosophy of the mind, it has been occasionally illustrated by the remarks of Kant, Helvetius, D'Alembert, Rousseau, and other speculatists both of France and Germany.

It has been observed that the rules of criticism were discovered and promulgated many centuries before the basis of those rules was investigated. Philosophical criticism, in this sense of the term, as a system of the laws of good writing and speaking, owes its origin to the labours of Aristotle. It is impossible to pass by the name of this profound and universal scholar, without acknowledging the grandeur of that genius which could maintain undisputed authority over the literary world for twenty centuries, which could procure for its decisions a respect only due to inspiration, and preserve to its possessor a reverence little short of idolatry. And though we rejoice in that unshackled freedom of intellect, which at present disclaims all submission in matters of thought to human legislators, and which has presumed to discover blemishes even in the laws of the Stagyrite himself, we cannot but observe how few are the accessions which his systems, on some subjects at least, have received from the assiduity of his successors and the progress of the human mind. The refined and subtle speculations of the last century have rather elucidated the justness of the old principles than discovered new ones; and the far greater portion of principles inculcated by the disciples of Aristotle are involved, more or less palpably, in the instructions of their master. The chief among the Greek writers, on the subject of criticism, are, Theophrastus, whose works are lost, Demetrius Phalereus, Dionysius Halicarnassensis, Longinus, and Hermogenes; among the Latins, Cicero, Horace, and, pre-eminently, Quintilian. Among those who have most diligently prosecuted the study since the revival of letters are, Vida, the elder Scaliger, Rapin, Bouhours, Bossu, Fontenelle, Du Bos, Rollin, Marmontel, La Harpe, Dryden, Roscommon, Buckingham, Shaftsbury, Pope, Addison, Harris, Spence, Johnson, Jos. Wharton, and many others whom it would be quite superfluous to name.

As the maxims of literary excellence were established long before the philosophy of those maxims was explored, so the excellence itself was attained long before the maxims were invented. It was from the practice of eminent writers that the early critics deduced those rules which modern philosophers have established on the constitution of human nature. It is the privilege of supreme genius to discover, by a kind of intuition or consciousness, what is fit and what is fair in works of fancy. Such writers as Homer and Shakspeare, deficient as they may be in that nicety of taste, which can only be acquired by an assiduous cultivation of the mind, discover instinctively the grand features of truth, and the fine proportions of beauty. And among the multitude of readers, there is a considerable number whose accurate judgment and keen sensibility can well dispense with the aid of lectures, on the principles of criticism. The truest decisions are often formed by those who have studied neither metaphysics nor rhetoric, and who are totally unable to state the reason of those decisions or evince their truth. This is not surprising. There are excellencies and defects so extremely palpable, that a mind of very moderate endowments, and very

scanty cultivation, will observe them as readily as the eye of a child discovers resemblance in a portrait, or its ear detects harshness in a discord. While there is a gradation of excellences and defects less and less obvious, there is also a gradation of intellectual powers more and more refined. It is quite conceivable, therefore, that a mind may be so fine in its original structure, as, in any but the nicest discriminations, to form true estimates, though it have received but little artificial refinement from instruction; "the prodigality of heaven" may have exempted it from the common necessity of laboriously employing its powers for the purpose of improving them. At the same time, it must be urged in favour of critical studies, that the majority of minds will not possess this superior quality, which requires no aid from cultivation; and that there will be cases requiring the highest mental refinement, in which the noblest natural powers may prove inadequate, for want of those rules which have been framed by the skill of proficients, and of that curious niceness, that consummate delicacy of perception, which can only be acquired by habitual exercise.

There is one strong distinction between Genius which produces literary excellence, and Taste which perceives it; inasmuch as the latter often exists unaccompanied with the power of invention, the former, never. If, therefore, a knowledge of the critical laws of excellence be not invariably essential to the perception, still less is it necessary to the production, of that excellence. Exuberance of imagination, and energy of sentiment, are never excited by those laws, and are often restrained. It is not to be expected of criticism, that it should create or enrich that genius which exists independently of its canons, and which it only presumes to direct. But no reader of taste, even of that low degree of it which is sometimes termed plain sense, can read many lines of Shakspeare without discovering incongruities and blunders for which nothing but his genius could have atoned. The absurdity of that one expression among thousands, "To take up arms against a sea of troubles," most powerfully enforces the importance of attention to the precepts of sound criticism, even in writers of the sublimest genius; not indeed to assist them in the conception of original and magnificent thoughts, but to prevent the degradation of such thoughts into an alliance with nonsense and folly. The laws of criticism, like the tables of the inspired decalogue, and the ordinances of civil legislatures, consist rather of prohibitions than commands. The active powers of the mind, like the appetites of the body, and the passions of the heart, are designed to afford that vigour and energy which laws are to regulate and correct. Indeed, this is far from being the only point in which such an analogy will be found to subsist. It is not too fanciful to observe, that genius is a sort of intellectual virtue, or radix of goodness, and taste a sort of literary conscience: that the principles of right and wrong are in both instances invariable, and independent of private judgment and casual caprice; that these principles are often complied with more from instinct than deliberation; that they were not embodied and recorded in explicit rules till they had been long acknowledged in practice; that they had existed for ages as authenticated rules before they were supported by a philosophical theory; that though excellence may be in some measure and in some rare instances attained, without any formal study, either of the rules or the theory, yet it is expedient for the bulk of individuals, it is serviceable in cases of nicety, and is useful in vindicating the practice or enforcing the sentiments we adopt. We may add that a knowledge of the ingredients of both kinds of excellence is often found to co-exist with an inability, physical in one case, but voluntary in the other, to reduce them to practice: and that while it is perfectly easy, it is also extremely common, for the meanest of critics to expose imperfections in the work of the best writer, or the character of the purest saint.

Nothing, perhaps, has tended so much to excite the public animosity against the generation of critics, as the fact just mentioned; that the most despicable of readers may detect a blemish in the most admirable of writers, and, calling his discovery a criticism, assume the airs of superiority and the tones of reproof. Nor is this grievance easy of redress. It results necessarily from the very nature of criticism, that faults of all dimensions in a writer should be exposed, whatever be the abilities of the critic. The shoemaker's criticism on the defective shape of a sandal in one of Apelles's finest pictures, was probably just: the sandal, no doubt, was incorrectly drawn, and the painter must submit to the cobler. The accurate and candid critic must have taken the same exception, and his more enlarged habits of nice examination might have enabled him to suggest many others; but he would at the same time have done justice to the extraordinary merits of the performance; and, almost blushing at his detection of such petty and inconsiderable blemishes, would exclaim in some such terms as those of the exquisite poetical critic, *Non* EGO *paucis offendar maculis!*

It is for the public to make a strong distinction between the minute caviller, who is in effect a defamer, though he tells us "nothing but the truth," and the genuine critic, who merits the praise of a just reporter, by honestly declaring "the whole truth." It is for this final tribunal to interpose between the malice or insolence of pretending critics, and the interests of meritorious writers; affording protection at the same time to the rights of literature, and to the reputation of honourable criticism.

If criticism be observed to produce censoriousness, the fault is rather to be ascribed to unworthy dispositions in the individual, than to a baneful tendency in the study. On this principle we may understand how it happens, that the same critic who descries nothing but imperfection and fault in his contemporaries, shall load the performances of distant times with the most lavish and undistinguishing applause.

It must be admitted, nevertheless, that a habit of critical examination has some tendencies over which there is reason to be jealous. While it polishes acumen, it deadens sensibility; it often gratifies pride at the expence of benevolence; and by refining taste to a fastidious delicacy, which has indeed a keener relish for productions of superlative excellence that rarely occur, but nauseates the more ordinary entertainments of literature; it multiplies our causes of ill-humour, and abridges our sources of enjoyment.

Historical Criticism, in the vague generic sense which is opposed to Philosophical, includes the determination of all matters of fact concerned in works of genius. It may be divided, perhaps, into 1. *Historical,* in the stricter sense, or that which regards the genuineness of a work of genius, its real author, or the real works of a given author, &c.; which also includes the whole science of Biblio-

graphy, or the knowledge of editions; and may be understood as extending to the truth of narrations contained in such works. 2. *Explanatory*, in which department are included the immense labours of scholiasts, commentators, grammarians, lexicographers, and translators, from the age of Aristarchus to the present day; and the names of whom it would have no valuable purpose to enumerate. 3. *Corrective*, or that which settles the text of a literary performance; this is subdivided into *authoritative*, which is founded on the evidence arising from the collation of manuscripts, editions, citations, &c.; and *conjectural*, in which the sagacity and learning of the critic are exerted to restore what is evidently corrupt, according to the indications of the context, the idiom of the language, and the testimony of other writers, &c. In this very important field of criticism, a long list of diligent and successful labourers might be inserted, among whom would be found the chief ornaments of classical and biblical literature, from the revival of learning, down to the age of Porson, Heyné, and Griesbach. To the diligence of those who have cultivated, many of them conjointly, the explanatory and corrective departments of criticism, we are principally indebted for our familiarity with the best models of literary excellence, for the diffusion of a refined taste among our scholars, and the extension of our knowledge, historical, moral, and religious. The zeal of these meritorious critics to distinguish themselves, has led them, however, into a variety of most ludicrous absurdities. The explainers have collected sheet after sheet of quotations, and written treatises, dissertations, excursuses, without end, professedly intending to illustrate their author, but, as some have shrewdly suspected, for the real purpose of erecting a monument of his editor's diligence and erudition. The conjectural emendators, while they have manifested the most dexterous and happy sagacity in detecting what is the spurious, and substituting what is probably the genuine reading, have exposed themselves to the keenest lashes of ridicule, by their eagerness to discover corruptions, the temerity of their innovations on the established text, very often in defiance of grammar, sense, and metre, and the presumptuousness with which they have announced their certainty of what their author intended, in spite of what he has said. An exquisite piece of satire, directed against this class of critics, particularly Bentley, is printed among Pope's works, with the celebrated history of Martinus Scriblerus, &c. under the title of Virgilius Restauratus. And a work of similar design, though of far less merit in point of delicate humour, entitled Canons of Criticism, was published by Edwards, to expose the rashness and extravagance of Warburton, in tampering with the text of Shakspeare. The example however of the ingenious, but impetuous G. Wakefield, as well as of many German critics, theological and classical, while they furnish fine subjects for satire, would seem to afford signal proof of its inefficacy. The rules of evidence derived from the collation of manuscripts have been greatly improved both in accuracy and extent, during the last fifty years, though they have not assumed the distinctness and importance of a system. 4. Another branch of what has been called Historical criticism may be designated by the term *scientific*, and may be considered as referring to all questions of truth, not included in the foregoing subdivisions, that can be involved in a work of genius; and consequently as laying under contribution the whole circuit of human knowledge. Under this subdivision, therefore, might be specified grammatical, logical, philosophical, moral, theological, and as many other kinds of criticism as could be required on any occasion, or provided with names.

Sacred Criticism may be regarded as literary criticism, applied to religious subjects; but is important enough to deserve a distinct, though brief specification. It includes *Biblical* and *Ecclesiastical criticism*. The former is conversant with the evidences, canon, text, language, manners, history, chronology, geography, theology, and morals of the sacred Scriptures. The study has received prodigious accessions from the critics of the last century, among whom Mill, Wetstein, and Griesbach, particularly deserve mention, for their valuable labours in restoring the sacred text. One branch, indeed, of biblical criticism originated in the eighteenth century; that which attempts to explain, illustrate, and confirm scriptural statements, by the knowledge of accounts which modern travellers have given of customs now existing in the East. The first work on this subject, is the Observations of the late rev. Thomas Harmer, a dissenting minister in Suffolk. A recent work by Dr. Gerard, entitled Institutes of Biblical Criticism, is a valuable addition to this department of literature. The other division refers to the history and opinions of the nominal church of Christ, since the apostolic age.

Musical Criticism appreciates the merit of musical compositions, in respect both of harmony and melody; in respect of originality, learning, elegance, expression, &c.; the styles of different composers; the excellence of the execution of musical compositions, vocal and instrumental, &c. It also includes the mathematical theory of music. The theory of the effect of music on the mind, and various laws deducible from it, are subjects of that philosophical criticism, which we have already considered as applying to all the fine arts. See MUSIC.

Criticism of Antiquities, comprises the principles of deciding on the genuineness, the age, the country, the occasion, and the style, of medals, or other monuments of antiquity.

Criticism of the Fine Arts, is a very extensive and interesting study, closely congenial with literary criticism in most of its branches. It requires a knowledge of history, chronology, anatomy, perspective, colours, &c.; a delicate sensibility to the charms of beauty, and the emotions of feeling; a taste, refined by the contemplation of the best works; a familiarity with the *chefs d'œuvres* of the first masters; an acquaintance with the distinguishing character of the principal schools, &c. &c. See PAINTING, SCULPTURE.

Periodical Criticism. Publications in this department of literature have in our time become so numerous, so excellent, so popular, and so powerful in the guidance of opinion and formation of taste, that we shall give a brief sketch of its origin and present state.

Though the prevalence of periodical works of criticism is not of older date than the last century, they originated in the seventeenth; for we shall not trace their antiquity still higher to the Bibliotheca of Photius, patriarch of Constantinople, in 857, as that valuable work was not confined to the criticism of contemporary productions, nor published in periodical parts. The earliest publication of the nature of a review, was, we believe, the Journal des Sçavans, by Hedouille de Sallo, in

1665-6. The first, we think, which appeared in England, was Weekly Memorials for the Ingenious, 4to. 1683. This was succeeded not long after by La Crose, in a publication entitled The Works of the Learned, 1691. Several similar works followed, as Miscellaneous Letters, giving an account of the works of the learned, both at home and abroad; weekly, 1694. The History of the Works of the Learned, 1699—1712. Censura Temporum, in the dialogue form, 1708, &c. The oldest journal now subsisting in a course of publication is the Gentleman's Magazine, which embraces summary critiques in its plan. It was first published Feb. 1, 1731, and consisted of abstracts and extracts from the newspapers, and other weekly publications of the time, political and miscellaneous, with a digest of the news of the preceding month.

The next publication was strictly a journal of criticism, and has been, at various periods in the course of its continuance, the ablest work of the kind in Europe. It was instituted by the father of the present proprietor in the year 1749. The first number for May, appeared June 1, of that year; and the following very awkward, and scarcely grammatical title, was prefixed to the first volume; "The Monthly Review, a Periodical Work, giving an Account, with proper Abstracts of, and Extracts from, the New Books, Pamphlets, &c. as they come out. By several Hands." At present it scarcely maintains its ancient character, partly because very formidable rivals have arisen to contend for the public esteem, partly because the death of able contributors occasions a vacancy, which is sometimes but inadequately supplied by successors. The respect it still receives is rather the civility due to age, than the homage extorted by transcendant merit. Its principles are generally deemed, in theology, Socinian, and somewhat sceptical; in politics, those of the popular party, as held by Mr. Fox.

In the year 1755, the celebrated Dr. Smollet established a new work, entitled the Critical Review; the first number of which, for January and February, appeared March 1. It was conducted by himself, with some ability, but with violent ill-temper, extreme insolence, and sometimes with glaring partiality, till he went abroad in 1763. This work has been unfortunate, the stock having at one time been consumed by a fire at the printer's, and the property having several times changed hands. It has consequently been marked with great inequality of talent, and the grossest violations of consistency. Till very lately, however, it has been respectable in point of execution; and is still purchased by those who have sets of the work, by the friends of those who are personally concerned in it, and by those partisans of Socinianism who have the most zeal and the least delicacy.

For the purpose of counteracting the principles of these two reviews, both religious and political, a new work, called the British Critic, was commenced June 1, 1793, by a society of gentlemen, united for the "Defence of British principles and British happiness," and declaring themselves the "Firm friends to real liberty as established by the British constitution, and to real Christianity, particularly as delivered in the evangelical doctrines of the church of England." Some admirable critiques in the early volumes of this work, together with the spirit of opposition among a larger portion of the people to the principles it was intended to counteract, procured for it an established sale and reputation, which it has not lost. At present, the arbitrary tone of its politics is much relaxed, its zeal for the established church is less vehement; and it is often distinguished for learning and diligence, generally for integrity, but seldom for wit or genius.

The Antijacobin Review and Magazine succeeded a newspaper of the same title, which was set on foot in the year 1797, and which was remarkable for its satirical humour and ingenuity, no less than for the violence with which it supported the measures and principles of Mr. Pitt's administration. These qualities were inherited by the review to which it gave birth, and which still subsists, though in far different hands from those of its original conductors, though with few traces of its early talent, and though the flame of party spirit which once gave it a large circulation, is at length nearly extinguished.

At the close of the year 1802, the public was surprised by the appearance of a very witty, saucy, and eloquent pamphlet from the north, under the title of the Edinburgh Review. The great superiority of this publication, both in genius and vivacity, to any existing critical work, soon obtained it a very liberal share of the public favour, which has almost ever since received additions each quarter as its numbers were published. As the object of the writers was to gain celebrity, they have commonly selected subjects for criticism which were most suited to attract attention, or to afford opportunity for displaying talent. This passion for fame, probably, has been the cause of several peculiarities in the work, which it would be ungenerous to attribute to a more dishonourable motive. It is this, no doubt, which has induced them to point their wit with malignity, to be brilliant at the expence of justice, ingenious to the neglect of truth, and insolent to the violation of decency. These peculiarities have been obvious enough to preserve the public from yielding unqualified assent to the criticisms with which they have been amused; and the literary influence of the work has been but small in comparison of that ascendancy over the general opinion which has been obtained by its masterly political disquisitions. It abstains, in general, with much caution from interfering with religious questions; yet on some occasions has disgraced itself by impeaching the authority of Divine revelation, scoffing at its doctrines, opposing its propagation, and reviling its believers.

A few months after the unexpected innovation made by the Edinburgh Review on the plan and style of critical works, a new publication appeared, under the title of The Annual Review; Arthur Aikin, editor, 1803. It differs chiefly from the Monthly and Critical in its form, and sometimes in the superiority of its execution, but demonstrates that the name of a responsible editor was but a delusive pledge to the world for its exemption from those faults which were chargeable on the anonymous reviewers.

The Eclectic Review, which commenced with the year 1805, was instituted as an antidote and substitute for such of the existing publications, as its conductors deemed of pernicious tendency. It is distinguished professedly from these, by its freedom from party bias, either political or religious, by its neutrality on the lesser points of difference between religious men, by its zeal for toleration, and for the essential truths, on which nearly all Christian denominations agree, by its tone of piety and scriptural morality, by its rigorous exclusion

of indelicate observations, and by the devotion of its profits to the support of the British and Foreign Bible Society. It has been conducted, of late especially, with a degree of learning, taste, justice, humour, and eloquence, generally equal, and often much superior, to that of any other monthly publication.

In addition to these works, and several appropriated to medicine and the arts, there are many magazines which allot a portion of their pages to criticism. In the Christian Observer, especially, some very admirable critiques have been printed.

Of the numerous extinct reviews which have appeared and vanished during the last fifty years, it seems unnecessary to take much notice. One of these was the London Review, established by Dr. Kenrick, on occasion of his quarrelling with the Critical, to which he had contributed. Another was Dr. Maty's Review, to which his name appeared, and the opinions in which were consequently expressed in the first person, though some valuable articles are known to have been written by the illustrious Porson: at a former period of life he had published a Journal des Sçavans, at Paris, and a Journal Brittanique, at the Hague, both in French. The Analytical Review was the work of a literary association, in which Mr. Godwin and Mrs. Wolstonecroft were leading members. Besides these, we have witnessed the rising and setting of the English, the Imperial, the General, and the Oxford Reviews, and a work of much ability called the Literary Journal; with others, perhaps, which have escaped our recollection. A most curious article might be written on the secret history of reviews, both existing and extinct; almost all the requisite knowledge is at this day perhaps in the possession of ten or twelve individuals, with whom however the greater part will probably perish.

Works of periodical criticism have abounded both in France and Germany, during the period just referred to: in the former country they have often been mere analyses, and sometimes only *catalogues raisonnées*; in the latter, they have mostly been journals not exclusively devoted to contemporary criticism. Our own country, therefore, stands unrivalled in this department of literary labour and luxury.

CRITO, one of the disciples of Socrates, who attended his learned preceptor in his last moments, and composed some dialogues.

CRITOLAUS, a citizen of Tegea in Arcadia, who, with two brothers, fought against the two sons of Demostratus of Pheneus, to put an end to a long war between their respective nations. The brothers of Critolaus were both killed, and he alone remained to withstand his three bold antagonists. He conquered them; and when, at his return, his sister deplored the death of one of his antagonists, to whom she was betrothed, he killed her in a fit of resentment. The offence deserved capital punishment, but he was pardoned, on account of the services he had rendered his country. He was afterwards general of the Achæans, and it is said that he poisoned himself, because he had been conquered at Thermopylæ by the Romans. (*Cicero*).

CRITONIA. In botany. See KUHNIA.

CROAGH-PATRICK, a mountain in the county of Mayo, Ireland, situated on the south of Clew-bay, and rising 2666 feet above the level of the sea.

To CROAK. *v. n.* (cpacezzan, Saxon.) 1. To make a hoarse low noise, like a frog. 2. To caw, or cry as a raven or crow (*Shakspeare*).

CROAK. *s.* (from the verb.) The cry or voice of a frog or raven (*Dryden. Lee*).

CROATIA, (part of the ancient Illyricum), a province of Hungary, the greatest part of which is subject to the house of Austria. It is bounded on the N. by the river Saave, which divides it from Sclavonia; on the E. by Bosnia; on the S. by Morlachia, and on the W. by the duchy of Carniola.

CROATS, or CRAVATS, in the manage, horses brought from Croatia in Hungary, which, for the most part, beat upon the hand, and bear up to the wind, that is, bear their necks high, thrust out their noses, and shake their heads.

CROCARDS, a name given by the Irish to a kind of money made of copper, sulphur, and a little silver; being brought from France, and circulated in Ireland before mints were set up at Dublin.

CRO'CEOUS. *a.* (*croceus*, Latin.) Consisting of saffron; like saffron.

CROCITA'TION. *s.* (*crocitatio*, Latin.) The croaking of frogs or ravens.

CROCK. *s.* (*kruick*, Dutch.) A cup; any vessel made of earth.

CRO'CKERY. *s.* Earthen war

CROCKET, in architecture, one of the small ornaments which are usually placed all along the angles of pinnacles, and on the outside of pediments, tabernacles, and cupolas, in the painted style of architecture.

CRO'CODILE. *s.* (from κρόκος, saffron, and δειλων, fearing.) In amphibiology. See LACERTA.

CROCODILE (Fossil), one of the greatest curiosities in the fossil world which late ages have produced. It is the skeleton of a large crocodile, almost entire, found at a great depth under ground, bedded in stone. This was in the possession of Linkius, who wrote many pieces of natural history, and particularly an accurate description of this curious fossil. It was found in the side of a large mountain in the midland part of Germany, and in a stratum of black fossile stone, somewhat like our common slate, but of a coarser texture, the same with that in which the fossil fish in many parts of the world are found. This skeleton had the back and ribs very plain, and was of a much deeper black than the rest of the stone; as is also the case in the fossile fishes which are preserved in this manner. The part of the stone where the head lay was not found, this being broken off just at the shoulder, but that irregularly; so that in one place a part of the back of the head was visible in its natural form. The two shoulder-bones were very fair, and three of the feet were well preserved; the legs were of their natural shape and size, and the feet preserved even to the extremities of the five toes of each.

Crocodile, *Crocodilus*, in rhetoric, a captious and sophistical kind of argumentation, contrived to seduce the unwary, and draw them speciously into a snare. It has its name crocodile from the following occasion, invented by the poets: A poor woman begging a crocodile, that had caught her son walking by the river-side, to spare and restore him, was answered, that he would restore him, provided that she should give a true answer to a question he should propose. The question was, Will I restore thy son or not? To this the poor woman, suspecting a deceit, sorrowfully answered, Thou wilt not; and demanded then to have him restored, because she had answered truly. Thou liest, says the crocodile; for if I restore him thou hast not answered truly: I cannot therefore restore him without making thy answer false. Under this head may be reduced the propositions called mentientes, or insolubiles, which destroy themselves. Such is that of the Cretan poet: "Omnes ad unum Cretenses semper mentiuntur:" "All the Cretans, to a man, always lie." Either, then, the poet lies when he asserts that the Cretans all lie, or the Cretans do not all lie.

CRO'CODILINE. *a.* (*crocodilinus*, Latin.) Like a crocodile.

CROCODILIUM. See Centaurea.

CROCODILOPOLIS, a town of Egypt, near the Nile, above Memphis. The crocodiles were held there in the greatest veneration; and they were so tame, that they came to take food from the hand of their feeders. It was afterwards called Arsinoe. (*Herodotus*, &c.)

CROCUS, a beautiful youth, enamoured of the nymph Smilax. He was changed into a flower of the same name, on account of the impatience of his love, and Smilax was metamorphosed into a yew-tree. (*Ovid*).

Crocus. (*crocus*, κροκος, of Theophrastus. Some derive this name from κροκις, or κροκη, a thread; whence the stamens of flowers are called κροκοιδις. Others, again, derive it from Coriscus, a city and mountain of Cilicia.) In botany, saffron. A genus of the class triandria, order monogynia. Corol six-parted, regular, with a very long tube; stigmas convolute, jagged. Three species, all common to the meadows of our own country.

1. C. sativus, with exserted, three-parted stigma; linear segments.

2. C. vernus; with three-cleft stigma inclosed in the corol, lobes wedge-shaped.

3. C. nudiflorus; with three-cleft stigma inclosed in the corol; lobes in many deeply cut segments; tube of the corol leafless. The officinal saffron, or prepared stigmas of c. sativus, has a powerful, penetrating, diffusive smell, and a warm, pungent, bitterish taste. Many virtues were formerly attributed to this medicine, but little confidence is now placed in it. The Edinburgh college directs a tincture, and that of London a syrup of this drug.

Crocus. In chemistry, a term given by the older chemists to several preparations of metallic substances, from their resemblance to the colour of saffron: thus, crocus martis, crocus veneris.

Crocus antimo'nii. (*crocus metallorum.*) This preparation is a sulphurated oxyd of antimony, and therefore called oxydum stibii sulphuratum in the new chemical nomenclature. It possesses emetic and drastic cathartic powers, producing a violent diaphoresis afterwards. See Oxydum stibii sulphuratum.

Crocus martis. See Ferrum or Iron.

CRŒSUS, the fifth and last of the Mermnadæ, who reigned in Lydia, was son of Alyattes, and passed for the richest of mankind. His court was the asylum of learning; and Æsop, the famous fable-writer, among others, lived under his patronage. In a conversation with Solon, he wished to be thought the happiest of mankind; but the philosopher apprised him of his mistake, and gave the preference to poverty and domestic virtue. Crœsus undertook a war against Cyrus, the king of Persia, and marched to meet him with an army of 420,000 men, and 60,000 horse. After a reign of fourteen years, he was defeated, B.C. 548; and he fell into the conqueror's hands, who ordered him to be burnt alive. The pile was already on fire, when Cyrus heard the conquered monarch three times exclaim Solon! with uncommon energy. He asked him the reason of his exclamation, and Crœsus repeated the conversation he had once with Solon on human happiness. Cyrus was moved at the recital, and at the recollection of the inconstancy of human affairs; he ordered Crœsus to be taken from the burning pile, and became one of his most intimate friends. The kingdom of Lydia was extinguished in him, and the power was transferred to Persia. Crœsus survived Cyrus. The manner of his death is unknown. (*Herodotus*, &c.)

CROFT. *s.* (cꞃoꝼt, Saxon.) A little close joining to a house, that is used for corn or pasture (*Milton*).

Croft (William), an English musician; born in Warwickshire, and educated under Dr. Blow, whom he succeeded as master of the children, and composer to the chapel royal, and organist of Westminster abbey. In 1712 he published his Divine Harmony, and in 1715 he was created doctor in music, by the university of Oxford. In 1724 appeared his Musica Sacra, in two volumes. He died in 1727, aged about fifty.

CROISADES, or Crusades. (from *croix*, a cross.) A name given to the expeditions of the Christians against the Infidels, for the recovery of Palestine. Those who engaged in expeditions of this kind wore a cross on their clothes, and bore one on their standard. The foundation of them was a superstitious veneration for those places where our Saviour performed his miracles, and accomplished the work of man's redemption. Jerusalem had been taken and Palestine conquered by Omar the successor of Abu Becr, who succeeded Mahomet himself. This proved a considerable interruption to the pilgrims, who flocked from all quarters to perform their devotions at the holy sepulchre. They had, however, still

been allowed this liberty, on paying a small tribute to the Saracen caliphs, who were not much inclined to molest them. But in 1065, this city changed its masters. The Turks took it from the Saracens; and being much more fierce and barbarous than the former, the pilgrims now found they could no longer perform their devotions with the same safety they did before. This at length induced Martin II. who then filled the papal chair, to enter warmly into the project of rescuing the holy city from the hands of the Infidels; and the first croisade, or holy war, commenced in the year 1095, when an army of 800,000 men set out for Constantinople: the second began in 1147, under Louis VII. and Eugenius III.: the third in 1189 and 1190, by Frederic I. surnamed Barbarossa, emperor of Germany, Henry II. of England, and Philip Augustus of France: the fourth in 1195, by pope Celestin III. and the emperor Henry VI.: the fifth in 1198, by order of Innocent III. wherein the French, Germans, and Venetians engaged: the sixth undertaken in the year 1217, under the pontificate of Honorius III. by the confederate arms of Italy and Germany, which ended in the rout of the Christians: the seventh under Frederic II. emperor of Germany; who set out in the year 1228, and concluded a truce of ten years with the sultan of Egypt in 1229, which was succeeded by inconsiderable and very unsuccessful expeditions in 1239, under Theobald VI. king of Navarre; and in 1240, under Richard earl of Cornwall, brother to Henry III. of England: the eighth under Louis IX. of France, in consequence of a vow which he had made in 1248; and the ninth and last, renewed by the same valiant but unfortunate monarch, who died of a pestilential disease in the harbour of Tunis, in the year 1270. These expeditions cost Europe at least two millions of its inhabitants, and an immense sum of money.

In these croisades, the horrid cruelties committed were enough to disgrace the most abandoned ruffians; and tended to inspire the Turks with an invincible hatred against the fanatic adventurers. No age nor sex was spared; but the inhabitants of Jerusalem, and the Holy Land, were massacred without mercy and without distinction: even sucking children were not suffered to escape the murderous hands of these barbarians. They marched over heaps of dead bodies towards the holy sepulchre; and while their hands were yet polluted with the blood of so many innocent persons, sung anthems to the Saviour of mankind. Nay, so far did their religious enthusiasm overcome their fury, that these ferocious conquerors now burst into tears. If the absurdity and wickedness of this conduct can be exceeded by any thing, it must be by what follows. In the year 1204, the phrensy of croisading seized the children, who are ever ready to imitate what they see their parents engage themselves in. Their childish folly was encouraged by the monks and schoolmasters, and thousands of those innocents were conducted from the houses of their parents on the faith of these words, "Out of the mouth of babes and sucklings hast thou perfected praise." Their base conductors sold a part of them to the Turks, and the rest perished miserably.

Yet, although these croisades were effects of the most absurd superstition, and were carried on with the most frantic cruelty, they eventually tended to promote the good of Europe. Though multitudes of crusaders were destroyed, many returned; and these having seen so much of people who lived more magnificently than themselves, began to entertain some taste for a refined and polished way of life. So that the barbarism in which Europe had been immersed, began to wear off soon after this time. The princes also who remained at home found means to avail themselves of the phrensy of the people. By the absence of such numbers of restless and martial adventurers, peace was established in their dominions. They also took the opportunity of annexing to their crowns many considerable fiefs, either by purchase, or by the extinction of the heirs; and thus the mischiefs which must always attend feudal governments were considerably lessened.

CROISES, or CROIZES, in English antiquity, pilgrims bound for the Holy Land; or such as had been there.

CROISIERS, a religious order, founded in honour of the invention of the cross by the empress Helena. In England they were called crouched friars.

CROMA. (Ital.) In music, the character which in England is called a quaver.

CROMARTY, or CROMERTY, the principal town of a shire of the same name, in the Highlands of Scotland, fourteen miles from Inverness. The shire of Cromarty, alternately with that of Nairn, sends a member to the British parliament. Lat. 57. 44 N. Lon. 3. 53 W. The county contains 3052 inhabitants.

CROMER, a town of England, situated on the north-east coast of the county of Norfolk. The town was formerly much larger than it now is, having had two churches, one of which, with many houses, was swallowed up by an inundation of the sea. This is a place of resort for sea-bathing, and has a weekly market on Saturdays. Distance from Norwich 23 miles; from London 127. Lat. 53. 4 N. Lon. 1. 15 E.

CROMFORD, a village in Derbyshire, on the river Derwent, in the road from Derby to Manchester. Here Mr. (afterwards sir Richard) Arkwright, erected some of the new cotton mills, a capital improvement of mechanism due to him; and by means of which the various branches of the cotton manufacture have wonderfully spread in this and the adjacent countries. Here also sir Richard Arkwright built, before his death, a noble seat, and a church. Cromford is fourteen miles N.N.W. of Derby.

CROMLECH, in British antiquities, are huge, broad, flat stones, raised upon other stones set up to support them. See Plate 50. They are common in Anglesea; and are by some supposed to be remains of sepulchres; by

others to be altars. It is probable that, at first, they were tombs, and were used as altars in after times. The cromlech differs from the kist-vaen, in not being closed up at the end and sides, and in being generally of larger dimensions: the terms cromlech and kist-vaen are, however, used indiscriminately for the same monument.

CROMORNE, in music, a reed stop in most of our old organs: its tone resembles a bassoon more than any other instrument.

CROMWELL (Oliver), protector of the commonwealth of England. He was born of a good family at Huntingdon, in 1599; and educated first at the grammar-school in that town, and then at Sydney-college, Cambridge, where his conduct was very irregular and dissipated. After a short stay there he went to Lincoln's-inn, where he did not improve his time better than at the university. At the age of twenty-one he married Elizabeth, daughter of sir James Bouchier, of Essex. About this time he professed himself a Puritan. In 1628, he was elected into parliament, where he distinguished himself by his zeal against the bishops. When that parliament was dissolved, he retired into the country, and took a farm at St. Ives, by way of improving his finances; which, however, did not answer. Afterwards he removed to Ely, and acquired some reputation as a preacher among the Puritans: this led some of the inhabitants of Cambridge to get him chosen a freeman of their corporation, with a view to his being elected their representative in parliament, which was accordingly effected. In the house he was very forward in attacking the measures of the court. When hostilities between the king and parliament were unavoidable, Cromwell raised a troop of horse at Cambridge. He soon obtained the rank of colonel; and though he was then forty-three years of age, he became an able officer, and made his men good soldiers. In 1643, he was appointed lieutenant-general, and sent to join the Scots. In the battle of Marston-moor, his cavalry behaved with such firmness and activity as to gain the name of Ironsides. He also distinguished himself in the second battle at Newbury. Some jealousy, however, was excited by his reputation, in the minds of many of his own party; and he and the earl of Manchester brought countercharges against each other in parliament, which ended without a prosecution. The battle of Naseby, in 1646, was gained entirely by his skill and bravery, for which, and other services, he received the thanks of the house. By this time Cromwell was at the head of the army, and as Charles was now betrayed by the Scotch to the parliament, he determined to have him in his own power. This he effected by means of cornet Joyce in 1647. The same year he purged the house of commons, that is, he turned out those members who he thought were not likely to be gained over to his purpose. The share he had in the murder of the king is too plain to need detail, or animadversion. Soon after this tragical event, a mutiny broke out in the army, which threatened dangerous consequences, but Cromwell, by seizing and punishing the ringleaders, put an end to it. In 1649 he went to Ireland, where, in less than a year, he subdued the whole island. He was next appointed commander-in-chief against the Scots, who had armed to restore Charles II. September 3, 1650, he gained the battle of Dunbar; and that day twelvemonth he defeated the king at Worcester. From this time he kept his eye bent upon taking possession of the sovereign power. He began by moulding the army to his will; and having a party subservient to his wishes, he struck a bold stroke by dismissing the parliament, and locking the door of the house. He then went to the council of state, and paid them the same compliment; after which he called a council, composed of his officers. The government was now completely in his hands, for the military council soon resolved that the administration of public affairs belonged to the lieutenant-general, under the title of protector of the commonwealth of England, Scotland, and Ireland. In 1653, he was invested with this dignity in the court of chancery, and the year following he declared by an ordinance, that England, Scotland, and Ireland, were but one state. The same year he called a parliament, but finding that instead of supporting him, the members began with questioning his authority, he put a guard upon their door, and then made them take an oath of allegiance to him and his government. This parliament still continued refractory, on which, in about four months, he dissolved them with very heavy reproaches. In 1656 he called another parliament, which gratified the protector by confirming his title, and sanctioning his proceedings. He wanted now to have the title of king, but this was rejected by his most zealous friends; and finding the object unattainable, he wisely abandoned it. However, he had the privilege granted him to make a sort of lords; and the title of protector being solemnly recognized, he was inaugurated with all the pomp of a coronation in Westminster-hall. In 1658 he convened the two houses of lords and commons, and addressed them in the language usual for the kings of England; but few of the hereditary nobles would attend his mock parliament. Finding, therefore, that he could not form any thing like a regular establishment, he dissolved the assembly with great affliction. In August of that year, his favourite daughter, Mrs. Claypole, died. He never recovered this shock, which was attended with a slow fever, of which he died, September 3, 1658. His remains were interred in Henry VIIth's chapel, Westminster, from whence at the restoration they were taken and exposed on the gallows at Tyburn. Some, however, have said that his corpse was privately buried in Naseby-field by his own direction; and that the body of Charles I. was deposited in the vault in the abbey. But this is not probable. He had six children, viz. Richard, Henry, Bridget, Elizabeth, Mary, and Frances. Richard succeeded him

in the protectorate, but when affairs turned, and he found his post no longer tenable, he gave it up and went abroad. He died at Cheshunt, in Hertfordshire, in 1712. Henry went to Ireland as lord-lieutenant, and bore a good character. He died 1674. Bridget married first general Ireton, and after his death, general Fleetwood; Elizabeth, his favourite daughter, married John Claypole, esq. of Northamptonshire. Mary was married to lord Fauconberg, and is supposed to have contributed greatly to the restoration of Charles II. She died in 1712. Frances married first a grandson of the earl of Warwick, and secondly sir John Russel of Cambridgeshire. (*Watkins*).

It is not easy to give an impartial view of the character of Oliver Cromwell; the representations of both his friends and his enemies are supported by such striking circumstances, in his fortune and conduct, as to give to them a great air of probability. Noble, in his Memoirs of the Protectoral House of Cromwell, says, "His character was formed from an amazing conjuncture of enthusiasm, hypocrisy, and ambition. He was posssessed of courage and resolution that overlooked all dangers, and saw no difficulties. He dived into the characters of mankind with wonderful sagacity, whilst he concealed his own purposes under the impenetrable shield of dissimulation. He reconciled the most atrocious crimes to the most rigid notions of religious obligations. From the severest exercise of devotion, he relaxed into the most ridiculous and idle buffoonery: yet he preserved the dignity and distance of his character in the midst of the coarsest familiarity. He was cruel and tyrannic from policy; just and temperate from inclination; perplexed and despicable in his discourse; clear and consummate in his designs; ridiculous in his reveries; respectable in his conduct; in a word, the strangest compound of villainy and virtue, baseness and magnanimity, absurdity and good sense, that we find on record in the annals of mankind."

Some writers have drawn his character in a strain of the most extravagant panegyric. Mr. Hume, perhaps, has fallen upon the proper medium between the two extremes. "If, (says he), we survey the moral character of Cromwell with that indulgence which is due to the blindness and infirmities of the human species, we shall not be inclined to load his memory with such violent reproaches as those which his enemies usually throw upon it. Amidst the passions and prejudices of that time, that he should prefer the parliamentary to the royal cause, will not appear extraordinary; since even at present many men of sense and knowledge are disposed to think, that the question, with regard to the justice of the quarrel, may be regarded as doubtful and ambiguous. The murder of the king, the most atrocious of all his actions, was to him covered under a mighty cloud of republican and fanatical illusions; and it is not impossible that he might believe it, as many others did, the most meritorious action which he could perform. His subsequent usurpation was the effect of necessity, as well as of ambition; nor is it easy to see how the various factions could at that time have been restrained without a mixture of military and arbitrary authority. The private deportment of Cromwell, as a son, a husband, a father, a friend, is exposed to no considerable censure, if it does not rather merit praise. And, upon the whole, his character does not appear more extraordinary and unusual by the mixture of so much absurdity with so much penetration, than by his tempering such violent ambition and such enraged fanaticism with so much regard to justice and humanity."

We know of no writer who seems to have more studied or better comprehended the character of Cromwell than Mrs. Hutchinson, the widow of colonel Hutchinson, a contemporary of the protector's, who, in her Memoirs of the Life of her husband, relates many anecdotes respecting him. We select the following eloquent representation of his government, after he had attained the height of his ambition; a representation, in which the keen regrets of disappointed patriotism are finely mingled with an indignant contempt for those who submitted to tyranny, and a generous admission of the talents and magnanimity of the tyrant.

"In the interim Cromwell and his armie grew wanton with their power, and invented a thousand tricks of government, which, when nobody oppos'd, they themselves fell to dislike and vary ev'ry day. First he calls a parliament out of his owne pockett, himselfe naming a sort of godly men for every county, who meeting and not agreeing, a part of them, in the name of the people, give up the sovereignty to him. Shortly after he makes up severall sorts of mock parliaments, but not finding one of them absolutely for his turne, turn'd them off againe. He soone quitted himselfe of his triumvirs, and first thrust out Harrison, then tooke away Lambert's commission, and would have bene king but for feare of quitting his generallship. He weeded, in a few month's time, above a hundred and fifty godly officers out of the armie, with whom many of the religious souldiers went off, and in their roome abundance of the king's dissolute souldiers were entertain'd, and the armie was almost chang'd from that godly religious armie, whose vallour God had crown'd with triumph, into the dissolute armie they had beaten, bearing yett a better name. His wife and children were setting up for principallity, which suited no better with any of them than scarlett on the ape; only, to speake the truth of himselfe, he had much naturall greatnesse, and well became the place he had usurp'd. His daughter Fleetewood was humbled, and not exalted with these things; but the rest were insolent fooles. Cleypoole, who married his daughter, and his son Henry, were two debauch'd ungodly cavaliers. Richard was a peasant in his nature; yet gentle and vertuous; but became not greatnesse. His court was full of sinne and vanity, and the more abominable, because they had

not yet quite cast away the name of God, but prophan'd it by taking it in vaine upon them. True religion was now almost lost, even among the religious party, and hipocrisie became an epidemicall disease, to the sad griefe of colonell Hutchinson, and all true hearted Christians and Englishmen. Allmost all the ministers every where fell in and worshipped this beast, and courted and made addresses to him. So did the city of London, and many of the degenerate lords of the land with the poore-spirited gentry. The cavaliers, in pollicy, who saw that while Cromwell reduc'd all the exercise of tirannical power under another name, there was a doore open'd for the restoring of their party, fell much in with Cromwell, and heighten'd all his disorders. He at last exercis'd such an arbitrary power, that the whole land grew weary of him, while he sett up a companie of silly meane fellows, call'd major-generalls, as governors in every country. These rul'd according to their wills, by no law but what seem'd good in their owne eies, imprisoning men, obstructing the course of iustice betweene man and man, perverting right through partiallity, acquitting some that were guilty, and punishing some that were innocent as guilty. Then he exercis'd another proiect to rayse money, by decimation of the estates of all the king's party, of which actions 'tis said Lambert was the instigator. At last he tooke upon him to make lords and knights; and wanted not many fooles, both in the armie and gentry, to accept of and strutt in his mock titles. Then the earle of Warwick's grandchild, and the lord Falconbridge, married his two daughters; such pittifull slaves were the nobles of those dayes. Att last Lambert, perceiving himselfe to have bene all this while deluded with hopes and promises of succession, and seeing that Cromwell now intended to confirme the government in his owne famely, fell off from him, but behav'd himselfe very pittifully and meanely, was turn'd out of all his places, and return'd againe to plott new vengeance at his house at Wimbleton, where he fell to dresse his flowers in his garden, and worke at the needle with his wife and his maides, while he was watching an oppertunity to serve againe his ambition, which had this difference from the protector's; the one was gallant and greate, the other had nothing but an unworthy pride, most insolent in prosperity, and as abiect and base in adversity."

CRONE. *s.* (cnone, Saxon.) 1. An old ewe (*Tusser*). 2. In contempt, an old woman (*Dryden*).

CRONEBANE, a mountain in the county of Wicklow, Ireland, rising about 1000 feet above the level of the sea, and noted for its copper mines.

CRONENBURG, a town of Germany, in the landgravate of Hesse Cassel. Lat. 49. 55 N. Lon. 8. 40 E.

CRONENBURG, a fortress of the isle of Zealand, in Denmark, at the entrance of the Cattegat, where the Danes take toll for such ships as are bound to the Baltic sea. Lat. 56. 0 N Lon. 12. 54 E.

CRO'NET. *s.* The hair which grows over the top of a horse's hoof.

CRONIUS, in chronology, the ancient name of the Athenian month Hecatombæon; which was the first of their year, and answered to the latter part of our June and beginning of July.

CRONSCHLOSS, or CRONSLOT, a town and fortress of Russia, seated in a little island of the same name, at the mouth of the river Neva, near the entrance of the Gulph of Finland, twelve miles W. of Petersburg. Lat. 59. 56 N. Lon. 29. 56 E.

CRONSTADT, or KRONSCHAD, a seaport town of Russia, situated on the island of Retusari, in the Gulph of Finland, where the principal part of the Russian fleet lies in harbour. The harbour is good and large, but the freshness of the water decays the timber. It is defended by several forts and ramparts. The houses are chiefly built of wood; the number of inhabitants about 60,000: twenty miles W. Petersburg. Lon. 29. 56 E. Lat. 59. 58 N.

CRONSTADT, or KRONSTADT, or BRASSAU, a town of Transylvania, situated about five miles from the river Alt, near the borders of Walachia, from which it is separated by lofty mountains, chiefly inhabited by Germans. The suburbs are inhabited by Bulgarians, Hungarians, and Saxons: fifty miles E.N.E. Hermanstadt. Lon. 26 E. Lat. 46. 30 N.

CRO'NY. *s.* (χρονος, time, age: it should consequently be spelt *chrony*.) An old acquaintance (*Swift*).

CROOK. *s.* (*croc*, French.) 1. Any crooked or bent instrument. 2. A sheephook (*Prior*). 3. Any thing bent; a meander (*Sidney*).

CROOKS, in music, certain moveable curved tubes, which are occasionally applied to trumpets and horns, for the purpose of tuning them to different keys. (*Busby*).

To CROOK. *v. a.* (*crocher*, French.) 1. To bend; to turn into a hook (*Arbuthnot*). 2. To pervert from rectitude (*Bacon*).

To CROOK. *v. n.* To be bent; to have a curvature (*Camden*).

CROO'KBACK. *s.* (*crook* and *back*.) A man that has gibbous shoulders (*Shakspeare*).

CROO'KBACKED. *a.* Having bent shoulders (*Dryden*).

CROO'KED. *a.* (*crocher*, French.) 1. Bent; not straight; curved (*Newton*). 2. Winding; oblique; anfractuous (*Locke*). 3. Perverse; untoward; without rectitude of mind (*Shakspeare*).

CROO'KEDLY. *ad.* 1. Not in a straight line. 2. Untowardly; not compliantly (*Tay.*)

CROO'KEDNESS. *s.* (from *crooked*.) 1. Deviation from straightness; curvity (*Hooker*). (See DISTORTION.) 2. Deformity of a gibbous body (*Taylor*).

CROP. *s.* (cnop, Sax.) The craw, or first stomach of a bird (*Ray*).

CROP. *s.* (cnoppa, Saxon.) 1. The highest part or end of any thing. 2. The harvest; the

corn gathered off a field; the product of the field (*Roscommon*). 3. Any thing cut off (*Dryden*).

To Crop. *v. a.* (from the noun.) 1. To cut off the ends of any thing; to mow; to reap; to lop (*Dryden*). 2. To gather before it falls (*Creech*).

To Crop. *v. n.* To yield harvest (*Shakspeare*).

CRO'PFUL. *a.* (*crop* and *full.*) Satiated; having a full belly (*Milton*).

CRO'PPER. *s.* (from *crop.*) A kind of pigeon with a large crop (*Walton*).

CROPPING, in the manage, an operation performed with a pair of sheers on the ears of a horse, dog, or other animal, when their natural form does not happen to contribute to its beauty. Mr. John Lawrence asserts, that he has cropped yearlings. "It is apparent (says he), in that time, or at any rate at two years old, whether from the over-size, ill-shape, or position of the ears, it will be ever necessary to crop the nag; and, if so, there is an obvious convenience in having it done early, and before he comes into work; and I have never found that the after-growth of the ear spoiled the crop. There is one disadvantage in this business, which, however, some people will think an advantage. It furnishes an opportunity of deception. One of the colts mentioned above I sold to a dealer at two years old: being cropped and docked, and neither his ears nor tail bearing the least mark of recent operation, he in one single day more reached four years of age, and was actually sold at Winchester fair as a four-year old." The practice of cropping the ears of animals, as it is confessedly useless, if not pernicious (in so far as it must occasion some imperfection in the conveyance of sound to the internal ear), might very well be dispensed with. See Ear.

CRO'PSICK. *a.* (*crop* and *sick.*) Sick with excess and debauchery (*Tate*).

CROSCOMB, a town of Somersetshire, near the city of Wells. King Edward I. granted it a market, and a fair at Lady-day; and his charter was confirmed by Edward III. and Henry IV. but this market being afterwards laid aside, another was procured for it, which is held on Tuesdays. Lat. 51. 10 N. Lon. 2. 35 W.

CROSETTES, in architecture, the returns in the corners of door-cases, &c.

CROSIER, or Crozier, a shepherd's crook; a symbol of pastoral authority, consisting of a gold or silver staff, crooked at top, carried occasionally before bishops and abbots, and held in the hand when they give the solemn benedictions. The custom of bearing a pastoral staff before bishops is very ancient, as appears from the life of St. Cæsarea of Arles, who lived about the year 500. Among the Greeks none but the patriarchs had a right to the crosier. The crosiers were at first no more than simple wooden staves in form of a T, used to rest and lean upon. By degrees they were made longer; and at length arrived to the form we now see them of. Regular abbots are allowed to officiate with a mitre and crosier.

Crosier, in astronomy, four stars in the southern hemisphere, in the form of a cross, serving those who sail in south latitudes to find the antarctic pole.

CRO'SLET. *s.* (*croisselet*, Fr.) A small cross.

CROSS, a gibbet made with two pieces of wood placed crosswise, whether they cross with right angles at the top like a T, or in the middle of their length like an X. The cross to which our Saviour was fastened, and on which he died, was of the former kind; being thus represented by old monuments, coins, and crosses. The punishment of the cross was common among the Syrians, Egyptians, Persians, Africans, Greeks, Romans, and Jews. It was the most dreadful of all others, both for the shame and pain of it; and so scandalous, that it was inflicted as the last mark of detestation upon the vilest of people. It was the punishment of robbers and murderers, provided that they were slaves too; but otherwise, if they were free, and had the privileges of the city of Rome, this was then thought a prostitution of that honour, and too infamous a punishment for such a one, let his crimes be what they would. The Mosaic law ordained, that the persons executed should not be left upon the tree after sun-set, because he that is hanged in this manner is accursed of God. Deut. xxi. 22. The Jews believe, that the souls of those who remain upon the gibbet, and without burial, enjoy no peace, and receive no benefit from the prayers of other people; but wander up and down till their bodies are buried: which agrees with the notions that the Greeks and Romans had of this matter, which may be seen in Hom. ii. 4, and Virg. Æneid 6.

Cross. *s.* (*croix*, French.) 1. One straight body laid at right angles over another (*Taylor*). 2. The ensign of the christian religion (*Rowe*). 3. A monument with a cross upon it to excite devotion, such as were anciently set in market-places (*Shakspeare*). 4. A line drawn through another. 5. Any thing that thwarts or obstructs; misfortune; hinderance; vexation; opposition; misadventure; trial of patience (*Ben Jonson*). 6. Money, so called because marked with a cross (*Howel*). 7. *Cross and Pile*, a play with money (*Swift*).

Cross. *a.* (from the substantive.) 1. Transverse; falling athwart fomething else (*Newton*). 2. Oblique; lateral (*Shakspeare*). 3. Adverse; opposite (*Atterbury*). 4. Perverse; untractable (*South*). 5. Peevish; fretful; ill humoured (*Tillotson*). 6. Contrary; contradictory (*South*). 7. Contrary to wish; unfortunate (*South*). 8. Interchanged (*Bacon*).

Cross. prep. 1. Athwart; so as to intersect any thing; transversely (*Knolles*). 2. Over; from side to side (*L'Estrange*).

To Cross. *v. a.* (from the noun.) 1. To lay one body, or draw one line athwart another

(*Hudibras. Watts*). 2. To sign with the cross (*Dryden*). 3. To cancel: as, to *cross* an article. 4. To pass over (*Temple*). 5. To move obliquely or athwart (*Spenser*). 6. To thwart; to interpose obstruction; to embarrass; to obstruct (*Clarendon*). 7. To counteract; to be inconsistent with (*Locke*). 8. To contravene; to hinder by authority; to countermand (*Shakspeare*). 9. To contradict (*Bacon*). 10. To debar; to preclude (*Shakspeare*).

To CROSS. *v. n.* 1. To lie athwart another thing. 2. To be inconsistent (*Sidney*).

CROSS (Invention of the), an ancient feast solemnized on the 3d of May, in memory of St. Helena's finding the true cross of Christ deep in the ground of mount Calvary.

CROSS (Exaltation of the), an ancient feast held on the 14th of September, in memory of the restoration of the true cross to mount Calvary, in 642, by Heraclitus.

CROSS-BEARER, in the Romish church, the chaplain of an archbishop, a primate, or the pope, who carries a cross before him on solemn occasions. Certain officers in the inquisition are also called cross-bearers.

CROSS (Pectoral), one made of gold or silver, and often enriched with diamonds; worn by Romish bishops, abbesses, &c. about the neck.

CROSS (Maids of the), a community of young women instituted in 1265, at Roye in Picardy, and afterwards dispersed to Paris and other towns. They instructed young persons of their own sex. Some took the three vows of poverty, chastity, and obedience; others retained their liberty.

CROSS (Judgment of the), a custom in France, at the beginning of the ninth century, of giving judgment in favour of one of two contending parties, who held his arms for the longest time lifted up to a cross.

CROSS, in botany, is used to express the arrangement of the petala of certain flowers; called plantæ flore cruciformi.

CROSS, in heraldry, is defined by Guillim, an ordinary composed of fourfold lines; whereof two are perpendicular, and the other two transverse; for so we must conceive of them, though they be not drawn throughout, but meet by couples, in four right angles, near the fesspoint of the escutcheon. This bearing was first bestowed on such as had performed, or at least undertaken, some service for Christ, and the Christian profession; and is held by many the most honourable charge in all heraldry. Guillim enumerates 39 different sorts of crosses.

CROSS (St. George's), or the red cross, in a field argent, is now the standard of England; that saint being the reputed patron of this nation.

CROSS, in coins, a name given to the right side or face, the other being called the pile or reverse. It has been a common error, that the reverse was meant by the cross.

CROSS, in the manage. To make a cross in corvets, to make a cross in balotades, is to make a sort of leaps or airs with one breath, forwards, backwards, sideways, as in the figure of a cross.

CROSS (Order of the), an order of ladies instituted in 1668, by the empress Eleanora de Gonzagua, wife of the emperor Leopold, on occasion of the miraculous recovery of a little golden cross, in which were inclosed two pieces of the true cross, out of the ashes of a part of the palace that had been burnt down: though the fire burnt the case wherein it was enclosed, and melted the crystal, it appears that the wood had not received the least damage.

CROSS, in surveying, an instrument consisting of a brass circle, divided into four equal parts, by two lines intersecting each other at the centre; at the extremity of each line there is a sight fixed, standing perpendicularly over the line, with holes below each slit, for the better discovery of distant objects. See SURVEYING.

CROSS-ARMED, in botany. See BRACHIATE.

CROSS-BAR SHOT, a bullet with an iron bar passing through it, and standing six or eight inches out at both sides: it is used at sea for destroying the enemy's rigging.

CROSS-BILL, in ornithology. See LOXIA.

CRO'SSBITE. *s.* (*cross* and *bite.*) A deception; a cheat (*L'Estrange*).

To CRO'SSBITE. *v. a.* (from the noun.) To contravene by deception (*Prior*).

CRO'SSBOW. *s.* (*cross* and *bow.*) A missive weapon, formed by placing a bow athwart a stock (*Boyle*).

CRO'SSBOWER. *s.* A shooter with a cross-bow (*Raleigh*).

CROSS-DIAL, a dial made in the form of a cross, which when elevated according to the latitude of the place, shews the time by the shadow of its edges. The method of drawing the hour lines on this dial is shewn in Leadbetter's Dialling, and in Ferguson's Lectures.

To CROSS-EXAMINE. *v. a.* To try the faith of evidence by captious questions of the contrary party (*Decay of Piety*).

CRO'SSGRAINED. *a.* (*cross* and *grain.*) 1. Having the fibres transverse and irregular (*Moxon*). 2. Perverse; troublesome; vexatious (*Prior*).

CROSS (Jerusalem.) See LYCHNIS.

CROSS (Knights), in botany. See LYCHNIS.

CRO'SSLY. *ad.* (from *cross.*) 1. Athwart; so as to intersect something else. 2. Adversely; in opposition to (*Tillotson*). 3. Unfortunately.

CROSS-MULTIPLICATION. See DUODECIMALS.

CRO'SSNESS. *s.* (from *cross.*) 1. Transverseness; intersection. 2. Perverseness; peevishness (*Collier*).

CRO'SSROW. *s.* (*cross* and *row.*) Alphabet; so named because a cross is placed at the beginning, to show that the end of learning is piety (*Shakspeare*).

CROSS (Scarlet). See LYCHNIS.

CROSS-STAFF. *s.* (from *cross and staff.*) An instrument commonly called the fore-staff, used by seamen to take the meridian altitude of the sun or stars (*Harris*).

CROSS-TREES, in a ship, four pieces of timber, bolted and let into one another across, at the head of the mast. Their use is to keep and bear the top-mast up; for the foot of the top-mast is always fastened into them.

CRO'SSWAY. *s.* (*cross* and *way.*) A small obscure path intersecting the chief road (*Shakspeare*).

CRO'SSWIND. *s.* (*cross* and *wind.*) Wind blowing from the right or left (*Boyle*).

CROSS (Winter), in botany. See ERISYMUM.

CROSSWISE. (*cruciatim.*) In botany, a term applied to leaflets in a whorl, when there are four of them forming a cross—also to anthers; as in glecoma and hippomane.

CROSS-WORT, in botany. See VALANTIA.

CROSSEN, a town of Silesia, in Germany, and the capital of a principality of the same name. It is 27 miles S.E. of Frankfort. Lat. 52. 5 N. Lon. 15. 49 E.

CROSSOPETRA. In oryctology, a genus of the class earths, order ponderous. Consisting of ponderous earth, a larger portion of silica, and a smaller of alumine; lightish, hard, parasytic, meagre, crystalline; not totally soluble in sulphuric acid, even in a boiling heat; melting with difficulty in the fire. Two species:

1. C. hercynica. Hercynian crossopetra. In four-sided rectangular tables or prisms, transversely striate, terminating at one end in a needle-point; two of them cutting each other crosswise and longitudinally. Found upon calcareous spar, in the mines of Hercynia, near Andreasburg, in smaller aggregate crystals, sometimes very minute, rarely pellucid, oftener diaphanous or opaque: colour milk-white, hyaline, yellowish, not always striking fire with steel, but frequently making a mark upon glass. It melts with borax and soda with ebullition.

2. C. scotica. Scotch crossopetra. In four-sided tables or prisms, one end running into a needle-point, and not united. Found in the mines of Scotland, near Strontian, and distinguished by its larger crystals.

CROSSO'STYLES. In botany, a genus of the class monadelphia; order polyandria. Calyx four-parted; petals four; inserted into the calyx; nectaries twenty threads inserted on the ring supporting the stamens, and alternating with them; berry one-celled, many-seeded. One species only; a native of the Society Islands.

CROTALARIA. Rattle-wort. A genus of the class diadelphia, order decandria. Legume turgid, inflated, pedicelled; filaments united, with a fissure down the back. Forty-five species—natives of Asia, Africa, or America; some with simple, others with compound leaves. They rise from a foot and a half to seven or eight feet high, and their flowers are red, blue, or yellow.

CROTALUM, an ancient kind of castagnetta, or musical instrument, found on medals, in the hands of the priests of Cybele.

The crotalum differed from the sistrum; though authors frequently confound the two. It consisted of two little brass plates, or rods, which were shaken in the hand, and in striking against each other made a noise.

CROTALUS. Rattle-snake. In zoology, a genus of the class amphibia, order serpentes. Plates on the belly; plates and scales under the tail; tail terminated by a rattle. The whole of this genus is furnished with poisonous fangs. They seldom bite except when irritated, or for the purpose of securing their prey. Their possession of the fascinating power which has been attributed to them is uncertain; the fact that small birds, squirrels, and leverets descend spontaneously from the branches of the tree under which the rattlesnake lies, and are devoured by it, is admitted on all hands; and those who deny its faculty of charming, find a difficulty of accounting for such a fact. The more common opinion of the incredulous is, that the animals thus devoured are in the first place terrified by the noise of the snake's rattle, and hence either lose all power of self-government, or continue to fly from branch to branch till they are so totally exhausted as to be compelled to fall down within his reach. There are five species of this genus:

1. C. milliarius. Abdominal plates thirteen; dorsal thirty-one. Cinereous with a triple row of black spots; a red spot between the dorsal ones. Inhabits Carolina.

2. C. horridus. Banded rattle-snake. Abdominal plates a hundred and sixty-seven; dorsal twenty-three. Inhabits America: the most venomous of the serpent tribe; grows to nearly six feet long, and as thick as a man's arm; is eaten by swine without injury; preys on birds and the smaller quadrupeds. Body covered with triangular brown spots. The rattle-snake is a viviperous animal, producing its young in the month of June, generally about twelve in number, and which by September acquire the length of twelve inches. There is little doubt of its occasionally receiving its young into its mouth and swallowing them in times of danger; for M. Beauvois, as well as many other naturalists, positively assert, that they have seen the fact. The former declares, that happening to disturb a rattlesnake in a walk near Pine-Log, he saw it immediately coil itself up and open its jaws, when instantly five small ones that were lying by, rushed into its mouth. He retired and watched the snake, and in the course of a quarter of an hour saw her discharge them. He approached it a second time, when the young retired into its mouth with greater celerity than before, and the snake immediately moved off among the grass and disappeared. The rattle consists of hollow, hard, dry, and semi-transparent bones, nearly of the same size and figure; resembling in some measure the shape of the human os sacrum; for, although only the last or terminal one seems to have a rigid epiphysis joined to it, yet

PL. XLIX.

Drawn from Life by S. Edwards.

Striped Rattle Snake.

London, Publish'd by Geo. Kearsley, Fleet Street Dec. 1 1808

has every one of them the like, so that the tip of every uppermost bone runs within two of the bones below it; by which contrivance they have not only a moveable coherence but also make a more multiplied sound, each bone hitting against the other two at the same time. The number of joints in the rattle of individuals is very various; from five to twelve, fifteen, twenty, and sometimes as high up as forty. The poisonous secretion is discharged from the fangs of the dog-teeth, or tusks placed without the upper jaws after the manner of the viper, and after the first bite, the animal seems progressively to lose its power of poisoning, till it has had time to recruit itself by a respite of some hours: so that the second bite, if given immediately after the first, does not prove so soon fatal, the third still less so, and sometimes the fourth not at all.

3. C. dryinas. Wood-rattle-snake. Abdominal plates a hundred and sixty-five; dorsal thirty. Whitish, with yellow spots. Inhabits America.

4. C. durissimus. Striped rattle-snake. Abdominal plates a hundred and seventy-two; dorsal twenty-one. There are two other species, differing a little in the number or relative proportion of their plates. Inhabits America: from one and a half to four and a half feet long: body mixed white and yellow with black rhombic spots, white on the disk; and in one variety two black bands on the head and neck: generally found under the trunks of fallen trees. See Nat. Hist. Pl. XLIX.

5. C. mutus. Dumb-rattle-snake. Plates of the body two hundred and seventeen; of the tail thirty-four. Inhabits Surinam; is very large, and has vast fangs; back marked with black rhombic concatenate spots; a black line behind the eyes; instead of a rattle is a quadruple row of very minute sharp scales. Probably not of this genus.

CROTALYSTRIÆ, in antiquity, a kind of morrice-dancers, who also played on the crotalum.

CROTAPHITE MUSCLE. (*crotaphites*, κροταφιτης; from κροταφος, the temple). See Temporalis.

CROTCHES, in ship-building, very crooked timbers in the hold or bread-room, from the mizen step aft, fayed across the keelson, to strengthen the ship in the wake of the half-timbers.

Crotches (Iron), crooked pieces of iron, used on board sloops and long-boats which go with shoulder-of-mutton sails, for the boom to lodge on.

CROTCHET, in printing, a sort of straight or curved line, always turned up at each extreme; serving to link such articles as are to be read together; and used in analytical tables, &c. for facilitating the divisions and subdivisions of any subject.

Crotchets are also marks or characters, serving to inclose a word or sentence, which is distinguished from the rest, being generally in this form [ ] or this ( )

Crotchet, in music, one of the notes or characters of time (see Character). In length it is equal to half the minim, or double the quaver.

Crotchet, an instrument used in Midwifery. See that article.

Crotchet, denotes also a perverse conceit, or odd fancy.

CROTON, Crotona, or Crotono, a sea-port town of Naples, in Italy. It is the see of a bishop. Lat. 39. 9 N. Lon 17. 27 E.

Croton. Wild-ricinus. In botany, a genus of the class monoecia, order monadelphia. Male: calyx cylindrical, five-toothed; corol five-petalled; stamens from ten to fifteen. Fem. calyx many-leaved; corolless; styles three, cloven; capsule three-celled; seeds solitary. Fifty-one species, scattered over Europe, Asia, Africa, and America. Of these the principal are,

1. C. tinctorium. Turnsole or lacmus plant; or bezetta cerulea: a native of the south of Europe, with rhombic, repand leaves; pendulous capsules, herbaceous stem, rising annually about nine inches high, with axillary, panicled flowers. The plant flowers in July: but requires in this country the warmth of a hot-bed to maturate its seeds. The turnsole, used as a colouring rather in confectionaries and chemistry, is made of the juice loosed between the empalement of the seeds.

2. C. sebiferum. Tallow tree; with leaves rhombic-ovate, pointed, very entire, glabrous. A native of China; rising to about the height of a cherry-tree. The fruit is enclosed in a pod or cover like a chesnut; and consists of three round white grains of the size of an ordinary hazel nut, with a small stone in the interior. From the kernels or expressed oil, the Chinese obtain tallow, of which they make their candles; which if properly manufactured would be equal to those worked in Europe.

3. C. tiglium. Parvana-wood. A native of India, with leaves ovate, pointed, serrate, glabrous; stem herbaceous: affording the Parvana wood, and Tiglii seeds of the dispensatories; which see.

4. C. lacciferum. Gum-lac-tree. Also a native of the East Indies, with leaves ovate, downy, cerulate, petioled; calyx downy. The officinal gum-lac exudes from this tree, of various hues and appearances.

CROTOPHAGA. Ani. In zoology, a genus of the class aves, order picæ. Bill compressed, semi-oval, arched, carinate on the back; upper mandible angular at each edge, nostrils pervious. Four species—natives of South America.

1. C. ani. Lesser ani. Blackish-violet; feet formed for climbing: tail long, wedged, of ten feathers; upper mandible incurvate at the tip; nostrils oval; tongue fleshy, entire. Thirteen and a half inches long; gregarious, many females laying in the same nest, each taking care of its own brood; eggs sea-green, spotted towards each end; feeds on fruits, seeds, worms and various insects: picks out the acarus

ricinus from the backs of cattle when infested with it; for which purpose, it is said that they lie down spontaneously. See Nat. Hist. Pl. XLVIII.

2. C. major. Greater ani. Blackish violet, the feathers edged with green: quill-feathers dusky-green; feet scansorial, or formed for climbing. Inhabits Cayenne; eighteen inches long: is docile and easily tamed.

3. C. varia. Varied ani. Varied with black and red; feet scansorial. Eleven inches long.

4. C. ambulatoria. Walking ani. Feet ambulatory, or formed for walking. Inhabits Surinam: except in the structure of the feet, exactly resembles the last.

To CROUCH. *v. n.* (*crochu*, crooked, Fr.) 1. To stoop low; to lie close to the ground. 2. To fawn; to bend servilely (*Dryden*).

Crouch, a small river in Essex, is navigable from the Thames near its mouth at Foulness point, to Hull bridge.

CROUP. In medicine, inflammation of the trachea. See Cynanche.

Croup, the rump of a fowl.

Croup of a horse, the extremity of the reins above the hips. The croup of a horse should be large and round, so that the tops of the two haunch bones be not within view of each other; the greater distance between these two bones the better: but yet it is an imperfection if they be too high, which is called horn-hipped; though that blemish will in a great measure disappear, if he can be made fat and lusty. The croup should have its compass from the haunch-bone to the very onset of the tail, and should be divided by a channel or hollow all along to the very extremity.

Mr. St. Bel says, in his account of the proportions of that celebrated racer—"The size of the croup of Eclipse, as it is given in the table of his proportions, always has appeared to me too great; and the examination of the ilion bones has confirmed me in that opinion. The extent of the os pubis and ischion occasioned too great a distance between the hind legs; so that two lines drawn from the fore to the hind feet, instead of running parallel to each other, incline outward. This defect necessarily occasioned a degree of wavering in the croup, perceptible, and somewhat unpleasant, in his gallop; but the muscular powers of the animal in question over-ruled the little defects which subsisted in the mechanism of his skeleton. When the croup is too narrow, the muscles which communicate with the loins and extremities are thin, and consequently weak. It is easily conceived that such an organization is a great fault in a race-horse."

Croup (A rocking), is when a horse's fore quarters go right, but his croup in walking swings from side to side: when such a horse trots, one of his haunch-bones will fall and the other rise, like the beam of a balance, which is a sign that he is not very vigorous.

Croup (To gain the), in the manage, is when a horseman makes a demitour upon another, in order to take him upon the croup. If, in a combat, you are hard put to it by your enemy, make a demipyroet at the end of the passade, and gain his croup.

Croup (Without slipping the), is an expression used for volts and a gallop; and signifies without traversing or letting the croup go out of the volt or tread of the gallop.

CROUPADE, in the manage, is a leap in which the horse pulls up his hind legs as if he drew them up to his belly. Croupades are higher leaps than those of curvets, which keep the fore and hind quarters of the horse in an equal height, so that he trusses his hind legs under his belly, withoutyerking, or shewing his shoes. Croupades differ from caprioles and balotades in this, that, in croupades, the horse does not yerk as he does in the other two airs. High croupades, are those raised above the ordinary height.

CROW. *s.* (cnape, Saxon.) In ornithology. See Corvus.

Crow, in mechanics, an iron lever, furnished with a sharp point at one end, and two claws at the other. It is often used in raising stones, or other great weights.

Crow, signifies also, the voice of a cock, or the noise which he makes in a morning, or at other times when cheerful.

To Crow. *v. n.* preterit I *crew* or *crowed*; I have *crowed* (cnapan, Saxon.) 1. To make the noise which a cock makes in gayety or defiance (*Dryden*). 2. To boast; to bully; to vapour (*Grandison*).

Crow-berry, in botany. See Empetrum.

Crow-foot, in botany. See Ranunculus.

Crow-garlic, in botany. See Allium.

Crow (Scare), in ornithology. See Larus.

Crow's stone, in oryctology, a species of animal petrifactions, of the genus Helmintholites: which see.

CROWD. *s.* (cnuꝺ, Saxon.) 1. A multitude confusedly pressed together. 2. A promiscuous medley (*Pope*). 3. The vulgar; the populace (*Dryden*). 4. (from *crwth*, Welsh.) A fiddle (*Hudibras*).

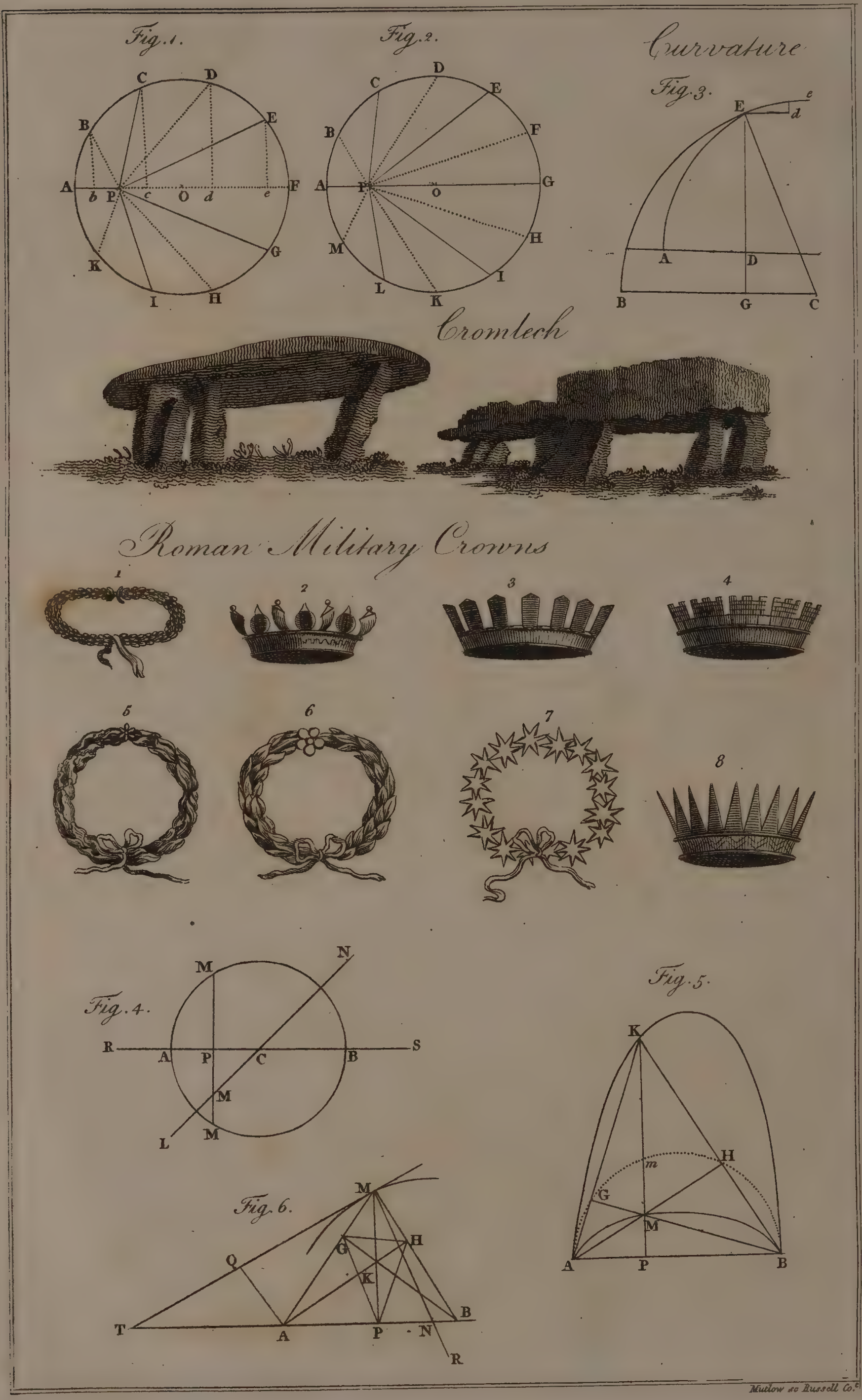
To Crowd. *v. a.* (from the noun.) 1. To fill with confused multitudes (*Watts*). 2. To press close together (*Burnet*). 3. To incumber by multitudes (*Granville*). 4. *To* Crowd *Sail* (a sea phrase.) To spread wide the sails upon the yards.

To Crowd. *v. n.* 1. To swarm; to be numerous and confused (*Dryden*.) 2. To thrust among a multitude (*Cowley*).

CRO'WDER. *s.* (from *crowd.*) A fiddler (*Sidney*).

CRO'WEA. In botany, a genus of the class decandria, order monogynia. Calyx fiveparted; petals five, sessile; stamens flat, subulate, connected by interwoven hairs; anthers growing longitudinally from the inner part of the filaments; capsules five, united; seeds coated. One species only, a native of Australasia.

CROWLAND, or Croyland, a town in



Mutlow sc Russell Co.

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the fens of Lincolnshire, having formerly a market on Saturdays. Here are the ruins of a very celebrated abbey, founded in honour of St. Guthlake. Here also is a very curious and ancient bridge. (See BRIDGE.) The chief trade is in hemp, fish, and wild fowls. Lat. 52. 41 N. Lon. 0. 10 W.

CROWN. *s.* (*couronne*, French.) 1. The ornament of the head which denotes imperial and regal dignity (*Shakspeare*). 2. A garland. 3. Reward; honorary distinction (*Dryden*). 4. Regal power; royalty (*Locke*). 5. The top of the head (*Pope*). 6. The top of any thing (*Shakspeare*). 7. Part of the hat that covers the head (*Sharp*). 8. A piece of money, valued at five shillings. 9. Honour; ornament; decoration (*Ecclus.*). 10. Completion; accomplishment.

CROWN, an ornament worn on the head by kings, sovereign princes, and noblemen, as a mark of their dignity. In scripture there is frequent mention of crowns, and the use of them seems to have been very common among the Hebrews. The high priest wore a crown, which was a fillet of gold placed upon the forehead, and tied with a ribbon of hyacinth colour, or azure blue. It seems also as if private priests, and even common Israelites, wore also a sort of crown, since God commanded Ezekiel not to take off his crown, nor assume the marks of one in mourning. This crown was no more than a ribbon or fillet, with which the Jews and several people in the east girt their heads. And indeed the first crowns were no more than a bandelet drawn round the head, and tied behind, as we still see it represented on medals round the heads of Jupiter, the Ptolemies, and kings of Syria. Afterwards they consisted of two bandelets; by degrees they took branches of trees of divers kinds; at length they added flowers, insomuch that Claudius Saturninus says, there was not any plant whereof crowns had not been made.

The Roman emperors had four kinds of crowns, still seen on medals, viz. a crown of laurel, a radial or radiating crown, a crown adorned with pearls and precious stones, and the fourth a kind of bonnet or cap, something like the mortier. The Romans had also various kinds of crowns, which they distributed as rewards of military achievements; as, 1. The oval crown, made of myrtle, and bestowed upon generals, who were entitled to the honours of the lesser triumph, called ovation. 2. The naval or rostral crown, composed of a circle of gold, with ornaments representing beaks of ships, and given to the captain who first grappled, or the soldiers who first boarded an enemy's ship. 3. The crown called in Latin *vallaris*, or *castrensis*, a circle of gold raised with jewels or palisades; the reward of him who first forced the enemy's entrenchments. 4. The mural crown, a circle of gold indented and embattled; given to him who first mounted the wall of a besieged place, and there lodged a standard. 5. The civic crown, made of the branch of a green oak, and given him who had saved the life of a citizen. 6. The triumphal crown, consisting at first of wreaths of laurel, but afterwards made of gold; proper to such generals as had the honour of a triumph. 7. The crown called obsidionalis, or graminea, made of grass growing on the place; the reward of a general who had delivered a Roman army from a siege. 8. The radial crown, given to princes at their translation among the gods. We meet also with the corona aurea, often bestowed on soldiers, without any other additional term; athletic crowns, and crowns of laurel, destined to crown victors at the public games, poets, orators, &c. All these crowns were marks of nobility to the wearers; and upon competitions with rivals for rank and dignities, often determined the preference in their favour; see plate 50. For an account of modern crowns, see HERALDRY.

CROWN, in architecture. See CORONA.

CROWN OF AN ARCH OF A BRIDGE, that part which is above the vertex of the arch, between the keystones and the road-way.

CROWN-POST, in carpentry, a king post.

CROWN, in astronomy. See CORONA.

CROWN OF THE SEED, in botany. (*corona seminis*). An appendage to the top of many seeds, enabling them to disperse. This is either the calycle, as in scabiosa, knautia, ageratum, arctotis—or a down (pappus), as in hieracium, sonchus, crepis, scorzonera, tragopogon, &c.

CROWN (Imperial), in botany. See FRITILLARIA.

CROWN, in an ecclesiastical sense, the clerical tonsure, which is the mark or character of the Romish ecclesiastics.

CROWN, in geometry, a plane ring included between two concentric circles. Its area is found by multiplying the rectangle of the sum and difference of the diameters of the two unequal circles, by the decimal ·7854.

CROWN, or CORONET, in heraldry, is used for the representation of that ornament, in the mantling of an armoury; to express the dignity of the person who bears it. The crown here is of more antiquity even than the helmet; and it was used as a symbol of victory and triumph.

CROWN, in music, a rest. See PAUSE.

CROWN (Pleas of the). See PLEAS.

CROWN (Clerk of the). See CLERK.

CROWN-OFFICE, an office belonging to the king's-bench court, of which the king's coroner or attorney is commonly master. In this office, the attorney-general and clerk of the crown severally exhibit informations for crimes and misdemeanours at common law, as in the case of batteries, conspiracies, libelling, &c. on which the offender is liable to pay a fine to the king.

CROWN-GLASS, denotes the finest sort of window-glass. See GLASS.

CROWN-SCABS, in farriery. See FARRIERY.

CROWN-WHEEL of a watch, the upper wheel next the balance, which by its motion drives the balance, and in royal pendulums is called the swing-wheel.

CROWN-WORK, in fortification, is an out-

work running into the field; designed to keep off the enemy, gain some hill or advantageous post, and cover the other works of the place. The crown-work consists of two demi-bastions at the extremes, and an entire bastion in the middle, with curtains.

To CROWN. *v. a.* (from the noun.) 1. To invest with the crown or regal ornament (*Dryden*). 2. To cover, as with a crown (*Dryden*). 3. To dignify; to adorn; to make illustrious (*Psalms*). 4. To reward; to recompense (*Roscommon*). 5. To complete; to perfect (*South*). 6. To terminate; to finish (*Dryd.*).

CROWNED. In the manage. A horse is said to be crowned when by a fall or other accident he is so hurt that the hair fall off without growing again.

CRO'WNET. *s.* (from *crown.*) 1. The same with *coronet.* 2. Chief end; last purpose (*Shakspeare*).

CROWNING, in sea-language, denotes the finishing part of a knot made at the end of a rope. It is performed by interweaving the ends of the different strands artfully amongst each other, so as that they may not become loosened or untwisted. Crownings are useful in all kinds of stoppers.

CROWNING, in architecture, is understood in general of any thing that terminates or finishes a member; as, a corniche, a pediment, the abacus, &c.

CROWTH, or CRUTH, a musical instrument, formerly much in use in Wales, somewhat like the violin. It has six strings supported by a bridge, standing in an oblique direction with respect to the strings, and is performed with a bow. Of the strings, which are six in number, the first four are conducted from the tail-piece down the finger-board; but the fifth and sixth, which are about an inch longer than the others, branch from them laterally, and range about the distance of an inch from the neck. A figure of this instrument is given in Pl. 40.

CROYDON, a town in Surrey, with a market on Saturdays. It is seated near the rise of the river Wandle, and is chiefly noted for being a residence of the archbishop of Canterbury. This town contains 1074 houses, and 5743 inhabitants. Lat. 51. 20 N. Lon. 0. 1 W.

CROZIER. See CROSIER.

CRUACHAN (Ben), a mountain in Argyleshire, Scotland, the top of which is about 3300 feet above the sea.

CRU'CIAL. *a.* (*crux, crucis,* Latin.) Transverse; intersecting one another (*Sharp*).

CRUCIAN, in ichthyology. See CYPRINUS.

CRUCIANELLA. Petty-madder. A genus of the class tetrandria, order monogynia. Corol one-petalled, funnel-form, with a filiform tube, and tailed border; calyx two-leaved, seeds two, linear. Eleven species, two or three of South America, the rest of the Mediterranean coasts: generally with spiked, terminal flowers of a blue colour.

To CRU'CIATE. *v. a.* (*crucio,* Latin.) To torture; to torment; to excruciate.

CRU'CIBLE. (*crucibulum,* from *crucio,* to torment: so named, because, in the language of old chemists, metals are tormented in it, and tortured to yield up their powers and virtues). A pot in common use for a variety of chemical purposes. It is generally made of clay, but sometimes of other materials, and is designed to endure a strong heat. The common shape of the earthen-ware crucibles is either three-cornered or round, and they are fitted with stoppers of the same materials, perforated, with a hole opening obliquely to allow the escape of any volatile matter, and to prevent the fuel from dropping within. As the lower part of the crucible would escape the greatest intensity of heat, and would be liable to crack by the draught of air if it were set directly upon the grate of the furnace, it is usually raised about two inches by a small stand which may be either solid or hollow. The latter, when inverted, also forms a convenient stand for an earthen retort. The lid of the crucible may be luted on, when necessary, with any kind of fire-lute (for which see the article CEMENT), particularly with a mixture of borax and clay. It is often of advantage to line the crucible with charcoal, for example, in the reduction of metallic ores that require no flux, such as the black oxyd of manganese. Chemists have usually done this by fitting into the crucible a solid piece of close well-burnt charcoal, and scooping out a hole in the latter; but it is a much more convenient way to mix some powdered charcoal with a very little linseed meal, to moisten it with just so much water as will bring the mixture to a stiff paste, and to line the crucible with it when wet. On applying the heat, the linseed-meal burns, and gives out a little flame and smoke which escape through the whole of the cover, but this does not derange the charcoal lining.

For enduring the highest heat without sinking, no vessels have been found so useful as the Hessian crucibles, which are made, according to Pott, by mixing a very refractory clay with sand, the finest part of which is separated by a sieve and rejected. The vessels are not turned in the potter's wheel as common pottery is, but the clay is made into a much stiffer mass with less water, and is fashioned into the necessary shape by being strongly rammed into an iron mould. This gives them such a degree of compactness that they will retain saline fluxes for a considerable time.

With regard to this latter circumstance, however, no earthy mixture can be made which will not be acted upon more or less by saline fluxes, and also by the vitrified metallic oxyds; and this is particularly the case with the vitrified oxyd of lead, which has long been used as a kind of test of the retentive power of crucibles, as it passes through the ordinary porous crucible in a very short time, almost

CRU

with as much ease as liquids through a sieve.

Ordinary crucibles may be made more retentive by being lined on the inside before they are quite dry with a thin coating of pure clay, without any other mixture.

The most refractory material known is a mixture of unburnt with burnt clay, and one that resists the operation of saline fluxes longer than any other; whence it is employed in the manufacture of the large crucibles for glass-houses. Close dense porcelain also retains saline matters long without being materially acted upon.

Crucibles are also made of cast-iron, of fine silver, and of platina. The former are sometimes of advantage in analyses, where a very strong heat is required to be given to substances in contact with alkaline fluxes, but they are seldom used. Silver crucibles are employed very serviceably in the common analysis or resolution of minerals; by caustic alkalis; and they are also extremely useful in a variety of other experiments where a heat not exceeding moderate redness is required, and where the substances do not act upon this metal. The use of platina for crucibles has so much increased of late, that this composition is now considered as essential to a well-furnished laboratory, and indeed not without reason, as there is no substance that unites so fully the qualities of infusibility at almost any heat, with resistance to the action of almost every chemical reagent. The caustic alkalies, however, have some dissolving power on this metal. Where a crucible of this kind is used in very high heats, particularly in fires from coal or coke, it should be loosely inclosed in a refractory earthen crucible, otherwise the vitreous slag of the coal is apt to encrust the outside of the platina vessel, and adhere to it with so much force as to render its removal extremely difficult.

CRUCI'FEROUS. *a.* (*crux* and *fero*, Latin.) Bearing the cross.

CRU'CIFIER. *s.* (from *crucify*.) He that inflicts the punishment of crucifixion (*Hammond*).

CRUCIFIX, a cross upon which the body of Christ is fastened in effigy, used by the Roman Catholics to excite in their minds a strong idea of our Saviour's passion. They esteem it an essential circumstance of the religious worship performed at the altar; and on Good Friday they perform the ceremony of adoring it; when the whole congregation bow with great reverence, and devoutly kiss the holy wood.

CRUCIFIXION, a capital punishment, by nailing the criminal to a cross. See CROSS.

Before crucifixion the criminal was generally scourged with cords: sometimes little bones, or pieces of bones, were tied to these scourges, so that the condemned person might suffer more severely. It was also a custom, that he who was to be crucified should bear his own cross to the place of execution. After this manner we find Christ was compelled to bear his own cross; and as he sunk under the burden, Simon the Cyrenian was constrained to bear it after him and with him.

CRU'CIFORM. *a.* (*crux* and *forma*, Lat.) Having the form of a cross.

CRUCIFORM or CROSS-SHAPED COROL. In botany. (*cruciformis, cruciata*). Consisting of four equal petals, spreading out in form of a cross: the claw longer than the border. These flowers constitute the fifth class in Tournefort's system; and are a principal character in the class tetradynamia of Linnéus. In the natural orders he has preferred the title of siliquosæ.

To CRU'CIFY. *v. a.* (*crucifigo*, Lat.) To put to death by nailing the hands and feet to a cross set upright (*Milton*).

CRUCI'GEROUS. *a.* (*cruciger*, Latin.) Bearing the cross.

CRUCIS EXPERIMENTUM. See EXPERIMENTUM.

CRUCITA, in botany, a genus of the digynia order, belonging to the tetrandria class of plants, and in the natural method ranking with those the order of which is doubtful. The interior calyx is four-leaved, the exterior calyx three-leaved; there is no corol, and only one seed. See CRUZITA, which is its more proper name.

CRUD. *s.* (commonly written *curd.*) A concretion of any liquid; coagulation.

CRUDE. *a.* (*crudus*, Latin.) 1. Raw; not subdued by fire. 2. Not changed by any process or preparation (*Boyle*). 3. Harsh; unripe (*Bacon*). 4. Unconcocted; not well digested in the stomach (*Bacon*). 5. Not brought to perfection; unfinished; immature (*Milton*). 6. Having indigested notions (*Milton*). 7 Indigested; not fully concocted in the intellect (*Ben Jonson*).

CRUDEN (Alexander), an industrious compiler, was born in 1701, and educated at Aberdeen, where he obtained the degree of M.A. In 1728 he came to London, and settled as a bookseller. In 1737 he published his Concordance to the Bible, a book of great merit. Cruden was a very pious man: but at times deranged in his mind. He died in the act of prayer, in 1770, aged 70.

CRU'DELY. *ad.* (from *crude.*) Unripely; without due preparation (*Dryden*).

CRU'DENESS. *s.* (from *crude.*) Unripeness; indigestion.

CRUDIA. In botany, a genus of the class decandria, order monogynia. Corol one leafed, with a four-cleft border; corolless; filaments dilated at the base; capsule orbicular, about two-seeded. Two species; both of Guiana.

CRU'DITY. *s.* (from *crude.*) 1. Indigestion; inconcoction (*Brown*). 2. Unripeness; want of maturity.

To CRU'DLE. *v. a.* To coagulate; to congeal (*Dryden*).

CRU'DY. *a.* (from *crud.*) 1. Concreted; coagulated (*Spenser*). 2. (from *crude.*) Raw; chill (*Shakspeare*).

CRU'EL. *a.* (*cruel*, French.) 1. Pleased with hurting others; inhuman; hardhearted; barbarous (*Dryden*). 2. Bloody; mischievous; destructive; causing pain (*Psalms*).

CRU'ELLY. *ad.* 1. Inhumanly; barbarously (*South*). 2. Painfully; mischievously (*Bacon*).

CRU'ELNESS. *s.* (from *cruel.*) Inhumanity; cruelty (*Spenser*).

CRU'ELTY. *s.* (*cruauté*, French.) 1. Inhumanity; savageness; barbarity (*Shakspeare*). 2. Act of intentional affliction (*Temple*).

A cruel disposition, says Dr. Cogan, respects the particular temper manifested in the contemplation or infliction of absolute misery. It has various degrees. Sometimes it is expressive of that hardness of heart, which is able to look upon extreme distress without any sensations of humanity. Sometimes cruelty is indicated by the voluntary and unnecessary infliction of misery: and in its highest state it rejoices and triumphs in the diffusion of horrors; in the wanton shedding of blood, and spreading desolation. It is gratified with the convulsions of agony; groans and lamentations are music in its ears. This fiend-like temper may proceed from a natural insensibility, strengthened by a perverse education; from envy; from a spirit of revenge for supposed injuries; from cowardice, resenting the panic it feels; or from insatiable ambition, which wades through torrents of blood, and renders the mangled bodies of the slain stepping-stones to that pre-eminence of station after which it aspires. Nor are these the only sources of cruelty: a late eloquent and energetic writer has shewn that a disbelief of a future state engenders this disposition; that "it leads its disciples to consider mankind as little better than a nest of insects, and in the fierce conflicts of party, to trample upon them without pity, and extinguish them without remorse." (*Hall on Infidelity.*)

CRU'ENTATE. *a.* (*cruentatus*, Latin.) Smeared with blood (*Glanville*).

CRU'ET. *s.* (*kruicke*, Dutch.) A vial for vinegar or oil, with a stopple (*Swift*).

CRUICKSHANK (William), a distinguished anatomist, was born at Edinburgh in the year 1746. At the age of fourteen he was sent to the university in that city, and after studying some years there, he was removed to Glasgow. He was originally intended for the clerical profession; but soon shewing a stronger propensity towards medicine than theology, he was placed under the care of Mr. Moore, surgeon, at Glasgow. From Mr. Moore he removed, in 1771, to London, where he was soon introduced and made librarian to Dr. William Hunter; an office in which he acquitted himself so well, that, on the secession of Mr. Hewson, he became the doctor's assistant, and in a little time joint lecturer with him. Here he had full scope for his abilities; and as he was as diligent as he was skilful, he added largely to the beautiful collection of anatomical preparations with which the museum of Dr. Hunter was filled, particularly by his curious injections of the lymphatic vessels. The result of his acquirements in this branch of anatomy he published in 1786, under the title of The Anatomy of the Absorbent Vessels of the Human Body. In this work, which he republished in 1790, he demonstrated the structure and situation of the valvular lymphatic absorbents. On the death of Dr. W. Hunter (in 1783) Mr. Cruickshank became partner in the lectures with the doctor's nephew, Dr. Baillie, and had with him the joint use of the museum, for the purpose of illustrating the lectures. In 1795, Mr. Cruickshank communicated to the Royal Society an account of the regeneration of the nerves. The same year he published a pamphlet on insensible perspiration; and in 1797, an account of appearances in the ovaria of rabbits, in different stages of pregnancy: but his fame rests principally upon his piece on the anatomy of the absorbents, which still continues, we believe, to be considered as the most correct and valuable work on the subject extant. Mr. Cruickshank died June 27, 1800, in his 54th year. (*Annals of Medicine. Rees.*)

CRUISE. *s.* (*kruicke*, Dutch.) A small cup (*Pope*).

CRUISE. *s.* (*croise*, French.) A voyage in search of plunder.

To CRUISE. *v. a.* (from the noun.) To rove upon the sea in search of plunder.

CRUI'SER. *s.* (from *cruise.*) One that roves over the sea in search of plunder (*Wiseman*).

CRUM. CRUMB. *s.* (cruma, Sax.) 1. The soft part of bread; not the crust (*Bacon*). 2. A small particle or fragment of bread.

To CRU'MBLE. *v. a.* (from *crumb.*) To break into small pieces; to comminute (*Herbert*).

To CRU'MBLE. *v. n.* To fall into small pieces (*Pope*).

CRU'MENAL. *s.* (from *crumena*, Latin.) A purse (*Spenser*).

CRU'MMY. *a.* (from *crum.*) Soft; not crusty.

CRUMP. *a.* (crump, Saxon.) Crooked in the back (*L'Estrange*).

To CRU'MPLE. *v. a.* (from *rumple.*) To draw into wrinkles (*Addison*).

CRU'MPLING. *s.* A small degenerate apple.

To CRUNK. *To* CRU'NKLE. *v. n.* To cry like a crane.

CRUOR, in medicine, the red part of the blood.

CRUPPER, the rump of a horse; also a roll of leather put under a horse's tail, and drawn up by a strap to the buckle behind the saddle, so as to keep him from casting the saddle forwards upon his neck.

CRURA. The plural of *crus*, a leg or root. In anatomy, applied to some parts of the body, from their resemblance to a leg or root: thus, crura cerebri, crura cerebelli, the crura of the diaphragm, &c. &c.

CRU'RAL. *a.* (from *crus*, *curis*, Latin.) Belonging to the leg (*Arbuthnot*).

CRURALIS, (*cruralis*, *musculus*; from *crus*, the leg). Cruræus. A muscle of the leg, situated on the fore-part of the thigh. It arises, fleshy, from between the two trochanters of the os femoris, but nearer the lesser, firmly adhering to most of the fore part of the

os femoris; and is inserted, tendinous, into the upper part of the patella, behind the rectus. Its use is to assist the vasti and rectus muscles in the extension of the leg.

CRURAL HERNIA. Femoral hernia. A tumour under the groin, and in the upper part of the thigh, arising from a protrusion of part of an abdominal viscus under Poupart's ligament. See HERNIA CRURALIS.

CRUS, in anatomy, that part of the body between the buttocks and the toes; it is divided into the thigh, leg, and foot.

CRUSADE. See CROISADE.

CRUSCA, an Italian term signifying bran, is in use among us to denote the celebrated academy called Della Crusca, established at Florence, for purifying and perfecting the Tuscan language.

CRUSE. See CRUISE.

CRU'SET. *s.* A goldsmith's melting-pot.

To CRUSH. *v. a.* (*ecraser*, French) 1. To press between two opposite bodies; to squeeze; to force by compression (*Milton*). 2. To press with violence (*Waller*). 3. To overwhelm; to beat down (*Dryden*). 4. To subdue; to conquer beyond resistance.

To CRUSH. *v. n.* To be condensed (*Thomson*).

CRUSH. *s.* (from the verb.) A collision; the act of rushing together (*Addison*).

CRUST. *s.* (*crusta*, Latin.) 1. Any shell, or external coat (*Addison*). 2. An incrustation; collection of matter into a hard body (*Addison*). 3. The case of a pie, made of meal, and baked (*Addison*). 4. The outer hard part of bread (*Dryden*). 5. A waste piece of bread (*Dryden*).

To CRUST. *v. a.* (from the noun.) 1. To envelop; to cover with a hard case. 2. To foul with concretions (*Swift*).

To CRUST. *v. n.* To gather or contract a crust; to gain a hard covering (*Temple*).

CRUSTA LACTEA. A disease that mostly attacks some part of the face of infants at the breast. It is known by an eruption of broad pustules, full of a glutinous liquor, which form white scabs when they are ruptured: is cured by mineral alteratives.

CRUSTACEA, in natural history, a division consisting of various species of apterous insects which has lately been adopted by several zoologists on the continent, with a view of avoiding numerous inconveniences that result from the classification of these animals in the Linnéan system. They consist almost entirely of the three tribes cancer, oniscus, and monoculus; which under the Linnéan arrangement constitute three distinct genera of apterous insects, and exhibit a difference of organs from all other insects. See ZOOLOGY.

Lamark and Cuvier were the two first physiologists who ventured upon proposing this heterodox deviation from the established system. They have since been followed by Bose and Latreille; the last of whom has fully developed the proposed plan in his Histoire Naturelle de Crustacés, from which we shall extract a general outline, in as summary a form as possible.

The crustaceous tribes, according to M. Latreille, are composed of animals "destitute of vertebræ, with articulated feet, which are often ten in number, apterous, invested with a calcareous covering, furnished with four antennas, palpigerous mandibles, with several jointed and imbricated pieces beneath, and feet destined only for walking or swimming: sometimes they are covered with a horny or soft substance, with not more than the usual number of antennas, and rarely any, mandibles naked, and unprovided with the numerous jointed pieces beneath, feet hookless, some of them apparently furnished with branchial processes, and two or four of them sometimes antenniform." This representation is loose and clumsy, whether regarded as description or definition. M. Latreille's object, however, is to make it sufficiently comprehensive to embrace both the entomostraca of Muller and Lamark, and the malacostraca of the ancient Greek naturalists; which, in effect, are the terms he selects to distinguish the two orders (or, as he denominates them, sub-classes), into which he divides his new class of crustacea.

I. The entomostraca, or first sub-class, is thus characterised: "Mandibles always naked or wanting. Jaws four at most. Body often inclosed in an univalve or bivalve case, rather horny than calcareous, or membranous, terminating in a point, or setigerous tail; eyes usually sessile; antennas for the most part wanting, or apparently supplying the place of gills; feet clawless at the extremity; and some of them, at least apparently, furnished with branchial appendages, in some instances shaped like antennas."

As the animals of this description, with a very few exceptions, are extremely minute, and all of them inhabit the water, they are still very imperfectly understood. This sub-class, as he strangely denominates it, is disposed into sections, orders, genera, and species.

The sections are two, and are entitled operculated and naked. The first comprises all those individuals that are covered with a crust or operculum. When this operculum presents the form of a shield, the animal belongs to a division of this section named clypeaceous, but when it more nearly resembles a bivalve shell, it is arranged under another division or subsection, denominated ostrachode. The second section, though distinguished by the name of naked, consists of animals not absolutely naked, (and hence the term is highly inappropriate) but whose crustaceous covering is disposed in the form of a series of rings, of which the first is the largest.

The orders (or rather the partitions so denominated by M. Latreille) under the first section, are xiphosura, pneumonura, and phyllopoda. Those under the second, ostrachoda, pseudopoda, and cephalota.

1. Xiphosura, or sword-tailed, is a term retained in compliment to Schoeffer, who first intro-

duced it; yet it is characteristically descriptive. The family it comprises is chiefly distinguished by the presence of mandibles and by simple feet, formed for walking or swimming. Its only genus is limulus. The species here described are heterodactylus, moluccanus, polyphemus, and rotundicanda; the first and last of these are represented from dried specimens in the Parisian Museum; the two intermediate are drawn from the monoculus polyphemus of Linnéus. They are all natives of the seas of both the Indies; and some of them are said to have a poison lodged in the tail. In hot summer evenings they often approach the shore, and remain all night half emerged from the water, the male usually resting on the back of the female; and both extremely careless of every thing but instant danger. A small part of their flesh is eatable; their eggs, which are numerous, are reckoned a great delicacy.

2. Pneumonura; so denominated because the tail appears to be furnished with branchial or respiratory appendages. Their feet are simple and formed for walking. They are parasitic animals adhering to various fishes, frogs, tadpoles, &c. from which they draw their nourishment. They are all oviparous and very small, the largest not exceeding four lines in length. The genera are three: caligus, with the tail formed of filaments or tubes; binoclus, tail of feathered laminæ, and no inflated feet; and ozulus, with a similar tail, and two inflated feet. The species are very few; and their history obscure.

3. Phyllopoda, or leaf-footed. Feet foliaceous or branchial, and formed only for swimming or breathing. They furnish but one genus, the apus, antecedently described by Schoeffer and Bose. The species of this genus are two; a. cancriformis, and a. productus.

4. Ostrachoda. Body covered with a crust, resembling a bivalve shell, and especially that of the oyster, but more horny and calcareous. The animal has two hairy filaments proceeding from the superior part of the body, disposed pencil like, or branched like arms. The genera are lynceus, daphnia, cypris, and cythera. They are for the most part very minute, and inhabit stagnant waters, or haunt fuci, confervæ, and various zoophytic productions for food. The genus daphnia is drawn from the Linnéan genus monoculus.

5. Pseudopoda. Head confounded with the first ring of the body; feet apparently useless for walking. Two genera. Cyclops, with a lengthened body and one eye, including the amymorse and nauplius of Muller; and argulus, with the body ovate and two eyes. They are for the most part microscopical animalcules.

6. Cephalota. Head distinct from the body. Three genera, polyphemus, zoea, and branchiopoda. The first contains one species only, polyphemus oculus; the MONOCULUS OCULUS of Linnéus, which see. The second species is described from Bose; it is transparent like glass, and is only visible in the water by its eyes, which are two, sessile and large, and by a small green spot. With its tail folded up, it appears like a globule, scarcely one quarter of a line in diameter, traversed by a spine. It moves in all directions with wonderful velocity. The last species is the cancer stagnalis of Linnéus.

II. Malacostraca. "Palpigerous mandibles; several rows of pieces in the form of palpi or jointed jaws in the mouth; four antennas, of which none are branchial; from ten to fourteen feet, solely destined for motion; tarsi with a corneous hook at the extremity; covering or annular segments of the body calcareous; eyes often pendunculated, and always two in number. The orders are two, decapoda and branchigastra. In the first the head is confounded with the thorax, and the feet are ten in number; in the second the head is distinct, the gills are external, and the number of feet generally exceeds ten.

The decapoda are divided into two sections; the brachyura, with the tail shorter than the body, terminated with a single piece, and destitute of foliaceous appendages at the end; and macroura, having the tail at least the length of the body, and terminated by several foliaceous appendages. This order is farther partitioned into families, and groupes of families, and modifications of these groupes. The genera are as follow:

1. Cancer. The crab-tribe, properly so called. See CANCER.

2. Dromia. Crust very protuberant; hind-feet recurved on the back. Three species: d. caput mortuum, found in the Mediterranean, and resembling a human head long buried. It muffles itself up in a head or cloak, resembling an argillaceous integument, or a bit of old leather, but which is really the alcyonium domunculus; and shrouded in this strange disguise, it equally deceives its enemies and its victims. The remaining two species are, d. artificiosa and d. rumphii, both exotics, and less worthy of notice.

3. Hepatus. Fore-feet notched like a cock's-comb, the exterior and palpiform pieces of the mouth having the second joint of their internal stem pointed. To this tribe belong some of the land-crabs of the West Indies, and America, many of which display a beautiful richness and variety of colouring, whence they are denominated painted.

4. Maia. Crust triangular, and very uneven; apparent extremities of the exterior and palpiform pieces of the mouth rounded, and very obtuse. Most of the species owe their protection to the roughness of their surface by which they are confounded with the adjacent rocks or stones, especially when they lie in a contracted and tranquil state, as they usually do on the appearance of danger. Maia includes the macropus, and leucosia, the former of which is the sea-spider of the ancients.

5. Corystes. Crust oval, exterior antennas long, projecting and approximated under the eyes; exterior and palpiform pieces of the mouth lengthened. Like some of the species

of dromia, those of this genus carry on their back extraneous bodies, such as the valves of shells, bits of fucus, sponge, coralline, &c.; so as to conceal themselves from their enemies, and the animals on which they subsist. The ranina and pagurus belong to this division, the latter comprehending the common hermit crab.

6. Albunea. Fore feet terminated by a single claw, tarsi conical, and falciform. This family includes the hippa, scyllarus, pallinurus, galathea. This genus is nearly allied to astacus.

7. Astacus. Fore-feet, and the extremities of the next two terminated by two claws; antennas inserted on the same line; the lateral with a spinous peduncle, and no lateral scale; the intermediate short, with two filaments. This genus includes both the lobster and the cray-fish.

The next order, or branchiogastra, is far less numerous than the preceding. It contains two genera only, which are as follow:

8. Squilla; exterior antennas simple, and furnished with a scale, the intermediate with three filaments; palpiform pieces of the mouth resembling feet, and terminated by a hook or claw; three pairs of feet terminated by a simple and hairy joint. The description is copied from de Geer.

9. Talitrus. From ten to fourteen feet: antennas simple, the intermediate placed above the exterior, and shorter than their peduncle; tail with articulated appendages. It includes the gammarus of Fabricius.

CRUSTA'CEOUS. *a.* (from *crusta*, Lat.) Shelly, with joints; not testaceous (*Woodw.*).

CRUSTA'CEOUSNESS. *s.* (from *crustaceous.*) The quality of having jointed shells.

CRU'STILY. *ad.* (from *crusty.*) Peevishly; snappishly; harshly.

CRU'STINESS. *s.* (from *crusty.*) 1. The quality of a crust. 2. Peevishness; moroseness.

CRU'STY. *a.* (from *crust.*) 1. Covered with a crust (*Derham*). 2. Morose; snappish: a low word.

CRUTCH. *s.* (*croccia*, Italian.) A support used by cripples (*Smith*).

To CRUTCH. *v. a.* (from *crutch.*) To support on crutches as a cripple (*Dryden*).

CRUX, in entomology. See CIMEX, COCCINELLA, PHALŒNA, &c.

CRUX, in astronomy, is sometimes used for crosier.

CRUXHAVEN, a seaport town of Germany, situated on the north coast of the duchy of Bremen, in the German ocean, between the mouths of the Elbe and the Weser. Lon. 8. 6 E. Lat. 53. 56 N.

CRUZ (Santa). See SANTA CRUZ.

CRUZITA. In botany, a genus of the class tetrandria, order digynia. Inner calyx four-leaved, outer double; corolless; seed one, naked. One species only; a native of South America, with a high stem; leaves opposite, lanceolate, entire; flowers spiked, collected into a panicle.

To CRY. *v. n.* (*crier*, French.) 1. To speak with vehemence and loudness (*Shakspeare*). 2. To call importunately (*Jonah*). 3. To talk eagerly or incessantly (*Exodus*). 4. To proclaim; to make publick (*Jeremiah*). 5. To exclaim (*Herbert*). 6. To utter lamentation (*Tillotson*). 7. To squall, as an infant (*Waller*). 8. To weep; to shed tears (*Donne*). 9. To utter an inarticulate voice, as an animal (*Joel*). 10. To yelp, as a hound on a scent (*Shakspeare*).

To CRY. *v. a.* To proclaim publickly something lost or found (*Crashaw*).

To CRY *down. v. a.* 1. To blame; to depreciate; to decry (*Tillotson*). 2. To prohibit (*Bacon*). 3. To overbear (*Shakspeare*).

To CRY *out. v. n.* 1. To exclaim; to scream; to clamour (*Job*). 2. To complain loudly (*Atterbury*). 3. To blame; to censure (*Locke*). 4. To declare loud. 5. To be in labour (*Shakspeare*).

To CRY *up. v. a.* 1. To applaud; to exalt; to praise (*Bacon*). 2. To raise the price by proclamation (*Temple*).

CRY. *s.* (*cri*, French.) 1. Lamentation; shriek; scream (*Exodus*). 2. Weeping; mourning. 3. Clamour; outcry (*Addison*). 4. Exclamation of triumph or wonder (*Swift*). 5. Proclamation. 6. The hawkers proclamation of wares to be sold: as, *the cries of London.* 7. Acclamation; popular favour (*Shakspeare*). 8. Voice; utterance; manner of vocal expression (*Locke*). 9. Importunate call (*Jeremiah*). 10. Yelping of dogs (*Waller*). 11. Yell; inarticulate noise (*Zeph.*). 12. A pack of dogs (*Milton*).

CRY'AL. *s.* The heron (*Ainsworth*).

CRY'ER. *s.* The falcon gentle (*Ainsworth*).

CRYPSIS. In botany, a genus of the class diandria, order digynia. Calyx glume two-valved, one-flowered; corol glume two-valved; awnless. One species only; a native of Siberia.

CRYPSORCHIS, or CRYSORCHIS. In physiology. (κρυψορχις, or κρυσορχις; from κρυπτω, to conceal, and ορχις, a testicle). A riggle: or animal that has one or both its testicles concealed in the belly, and not fallen into the scrotum.

CRYPTA, a subterraneous cell or vault, especially under a church, for the interment of particular families or persons. S. Ciampini, describing the outside of the Vatican, speaks of the cryptæ of St. Andrew, St. Paul, &c. The word is formed of κρυπτω, *abscondo*, I hide; whence κρυπτη, *crypta.* Vitruvius uses the word crypta for a part of a building, answering nearly to our cellar; Juvenal for a *clouca.* Hence *crypto porticus*, a subterraneous place arched or vaulted, used as an under-work or passage in old walls. The same is also used for the decoration at the entry of a grotto.

CRYPTA is also used by some of our ancient writers for a chapel or oratory under ground.

CRYPTÆ. (*crypta* κρυπται; from κρυπτω, to hide). A term given by anatomists to the little rounded appearances at the end of the small arteries of the cortical substance of the kidneys, that appear as if the artery were convoluted upon itself.

CRYPTANDRA. In botany, a genus of the class pentandria, order monogynia. Calyx five-leaved; corol tubular, with a five-cleft border, and five-hooded scales between the segment; stamens inverted in the throat under each scale; stigma three cleft; capsule superior three valved, three celled from the influted valves: seeds solitary, compressed. One species only; an Australasian shrub with tufted leaves; and flowers in bristly heads.

CRYPTIA, in Grecian antiquity, the ambuscade.

CRY'PTICAL. CRY'PTICK. *a.* (κρυπτω.) Hidden; secret; occult (*Glanville*).

CRY'PTICALLY. *ad.* (from *cryptical.*) Occultly; secretly (*Boyle*).

CRYPTOCEPHALUS. In zoology, a genus of the class insectæ, order coleoptera. Antennas filiform; feelers four; thorax margined; shells immarginate; body somewhat cylindrical. Three hundred species scattered over the globe; which may be thus conveniently subdivided into sections.

A. Feelers equal, filiform.

α. Jaw one-toothed, of which some have the lip entire, cylindrical; others lip entire, palpijerous at the base, forming the tribe named cebrio by Fabricius; a third sort, lip bifid, body oblong, the tribe by Fabricius named cistela.

β. Jaw bifid; body oblong: the Fabrician tribe crioceris.

B. Feelers unequal; fore-ones hatchet-shaped.

α. Lip horny. The Fabrician tribe erotylus.

β. Lip membranaceous, entire. By Fabricius named lagria.

γ. Lip membranaceous, widely emarginate. The dryops of Fabricius.

C. Feelers unequal, hind-ones hatchet-shaped. The tillus of Fabricius.

These for the most part are found in gardens upon shrubs and herbs, often upon the asparagus.

One of the most curious species is c. coffeæ, found upon the coffee plant, which it exactly resembles in shape and size.

CRYPTOGAMIA. (κρυπτος and γαμος, concealed nuptials). The name of the twenty-fourth class in the Linnéan artificial system, comprehending the vegetables whose fructification is concealed, or at least too minute to be observed by the naked eye. It is divided into five orders: 1. filices or ferns; 2. musci or mosses; 3. hepaticæ; 4. algæ or flags; 5. fungi or fungusses.

CRYPTO'GRAPHY. *s.* (κρυπτο and γραφω.) 1. The act of writing secret characters. 2. Secret characters; ciphers.

CRYPTO'LOGY. *s.* (κρυπτω and λογος.) Enigmatical language.

CRYPTOSTOMUM, in botany, a genus of the pentandria monogynia class and order. Essential character: calyx ventricose, five-cleft; tube of the corol inserted into the throat of the calyx; border five-cleft; nectary five-toothed, closing the mouth of the corolla; berry; seeds scarred. There is but one species, viz. c. guianense, guiana cryptostomum; with four or five white flowers on a short axillary peduncle.

CRYSTAL, in chemistry, and mineralogy. See CRYSTALLOGRAPHY.

CRY'STAL. *a.* 1. Consisting of crystal (*Shakspeare*). 2. Bright; clear; transparent; lucid; pellucid (*Dryden*).

CRY'STALLINE. *a.* (*crystallinus*, Latin.) 1. Consisting of crystal (*Boyle*). 2. Bright; clear; pellucid; transparent (*Bacon*).

CRYSTALLINE HEAVENS, in the old astronomy, two orbs imagined between the primum mobile and the firmament, in the Ptolemiac system, where the heavens were supposed solid, and only susceptible of a single motion. King Alphonsus of Arragon is said to have introduced the crystallines, to explain what they called the motion of trepidation, or titubation.

CRYSTALLINE LENS. (*lens crystallina*; *crystallina*, from its crystal-like appearance). A lentiform pellucid body, enclosed in a membranous capsule, called the capsule of the crystalline lens, and situated in a peculiar depression in the anterior part of the vitreous humour. Its use is to transmit and refract the focus of the rays of light to the vitreous humour.

CRYSTALLIZA'TION. *s.* (from *crystallize.*) 1. Congelation into crystals (*Quincy*). 2. The mass formed by congelation or concretion. See CRYSTALLOGRAPHY.

To CRY'STALLIZE. *v. a.* (from *crystal.*) To cause to congeal or concrete in crystals.

To CRY'STALLIZE. *v. n.* To coagulate, congeal, concrete, or shoot into crystals.

CRYSTALLOGRAPHY. (from κρυσταλλος, *glacies*, ice, and γραφη, *scriptura*, a written treatise.) The doctrine of crystallization; or the science which teaches by what means substances capable of crystallization become crystallized, or converted into a solid mass of geometrical figures, often resembling ice, from their transparency and absence of all colour. To rock crystal, the general term crystal seems to have been first applied by the Romans; for from its hyaline appearance, and its being procured among the Alps and other cold mountainous regions, in which ice is to be found at all seasons of the year, it bears a much nearer resemblance to ice than any other crystallized substance; and was at first supposed to be nothing more than water indurated by continued frost to a greater degree than common ice, and therefore more permanent. The term was, however, afterwards used in a more extended sense, and applied to all substances, uniting after a separation of their particles, into a regular figure.

In treating of the science of crystallography, we shall first notice the chief phænomena observable during crystallization, and next the laws by which such phænomena are regulated.

I. *Phænomena of crystallization.*

Bodies of all kinds have a common tendency to approximate and unite; this tendency is founded on the law of gravitation. Bodies of similar kinds have a tendency not only to unite, but to cohere, and produce a permanent increment of mass; this disposition is dependant on what is denominated the law of aggregation. But there is something more than this which is universally observable, before we ascend from brute insentient mat-

ter, to animal or even vegetable organization: there is another law regulating unorganized bodies, by which they are induced to assume not merely an aggregate and augmented compact and solid form, but a regular, and, when uninterrupted in the operation of this law, an unvaried arrangement of their homogeneous and integrant particles, not only in the external figure, but through the whole of the internal structure of the entire mass, apparently commencing from a single central molecule, which has hence been denominated the primitive nucleus; and it is this regulation which constitutes the law of crystallization.

All compound bodies (and it is highly probable that most of those which chemistry is obliged to rank as simple, are in fact compounded), may be considered as made up of integrant molecules, each of which is again composed of elementary molecules. Thus a mass of muriated soda consists of a vast multitude of little tubes, which are its integrant particles, each of which is resolvable into muriatic acid and soda, which are its elementary particles.

All the integrant particles of the same substance are of the same figure; and when united by the law of crystallization, without foreign interruption, extend the same figure in different directions, to the general aggregate that results.

All substances that require to be crystallized, require that their integrant molecules should be separated from each other, by the intervention of a medium, in which they may move freely, according to the attraction of their crystalline polarity. But this necessarily implies two distinct operations; for the same attraction, exerted by the medium or solvent, to overcome the aggregation of a body, and reduce it to its integrant molecules, will also prevent the efficacy of its crystalline polarity. It is necessary, therefore, after having assembled the aggregation of a solid, by the requisite quantity of a solvent, to abstract by degrees such a portion of it, that the attraction of the remainder shall be inferior to the crystalline polarity of the substance dissolved. The simplest substance that can be employed is caloric; and many great advantages attend its exclusive use: a number of cases, however, occur, in which its application is impracticable, except in combination with some liquid menstruum, as water or alcohol.

Before the integrant molecules of bodies be capable of moving freely, so as to produce crystallization, it is absolutely necessary that they be rendered fluid. But they can only be rendered fluid by solution in a liquid, or by fusion, in consequence of caloric or heat: and hence these are the only methods of forming crystals in our power.

Solution is the common method of crystallizing salts. They are dissolved in the water; the water is slowly evaporated, so that the different particles of the crystallizing substance may come within the range of crystallizing polarity, while as little disturbance is produced by the subtraction of the solvent as possible; the saline particles in consequence approach each other, or rather those at a distance approach some central particle, constituting the embryo or nucleus; they combine together, and form small crystals, which become constantly larger by the addition of other particles, till at last they fall by their gravity to the bottom of the vessel.

It ought to be remarked, that different salts require very different degrees of heat to produce crystallization. Some salts dissolve in very small proportions in cold water, but are very soluble in hot water; in other words, water, at the common temperature, has little effect upon them; but water, combined with an additional quantity of caloric, dissolves them readily. When hot water saturated with any of these salts cools, it becomes incapable of holding them in solution; the consequence of which is, that the saline particles approach each other and crystallize. But were we to attempt to crystallize them by evaporating the hot water, we should not succeed; nothing would be procured but a shapeless mass. Sulphat of soda is a salt of this kind; and to crystallize such salts, nothing more is necessary than to saturate hot water with them, and to set it by to cool gradually. Many salts, which follow this law of crystallization, combine with a great deal of water; or, in other words, many crystals formed in this manner contain a great deal of water of crystallization.

There are many substances, however, neither soluble in water nor other liquids, which, notwithstanding, are capable of assuming a crystalline form. This is the case with the metals, with glass, and some other bodies. The method employed for the crystallization of these is fusion, which is still a solution by means of caloric. By this method the particles are sufficiently separated from one another; and if the cooling proceed gradually, they are at liberty to arrange themselves in regular crystals.

To obtain large artificial crystals of a regular shape.— This curious branch of practical chemistry has been much improved by M. Leblanc, who has not only succeeded in obtaining regular crystals of almost any size at pleasure, but has made many interesting observations on crystallization in general. His method is as follows. The salt to be crystallized is to be dissolved in water, and evaporated to such a consistency, that it shall crystallize on cooling. Let this be set by, and when quite cold, pour the liquid part off the mass of crystals at the bottom, and put it into a flat-bottomed vessel. Solitary crystals, constituting distinct systems of crystallizing molecules, form at some distance from each other, and these may be observed gradually increasing. Pick out the most regular of these, and put them into a flat-bottomed vessel at some distance from each other, and pour over them a quantity of liquor obtained in the same way, by evaporating a solution of the salt till it crystallizes on cooling. Alter the position of every crystal, at least once every day, with a glass rod, that all the faces may be alternately exposed to the action of the liquid; for the inferior face, or that on which the crystal rests, can never, while in that position, receive any increment. When by this process the crystals have acquired such a magnitude that their forms can easily be distinguished, the most regular are to be chosen, and to be put separately into a vessel filled with a portion of the same liquid, and turned in the same manner several times a day: and by this treatment they may be obtained of almost any size we think proper. After the crystal has continued in the liquid for a certain time, the quantity of salt held in solution becomes so much diminished, that the liquid itself begins to act upon the crystal, and to redissolve it. This action is first perceptible on the angles and edges of the crystal, which, in consequence, at first become blunted, and gradually lose their shape altogether. Whenever this begins to be perceived, the liquid

must be poured off, and aportion of new liquid put in its place, otherwise the crystal will infallibly be destroyed. M. Leblanc has observed, that the singular change begins first at the surface of the liquid, and extends gradually to the bottom; so that a crystal, if large, may be often perceived in a state of increase at its lower end, while it is disappearing at its upper extremity.

The access of air has a considerable influence on this process. If a saturated solution of salt, when hot, be put into a vessel from which the air is excluded, it does not crystallize even when cold. But if air be admitted, the crystallization immediately commences, and proceeds with rapidity. It has been shewn by Dr. Higgins, that any pressure equivalent to that of the atmosphere, as the pressure of a column of mercury, for example, has the same effect.

During crystallization, a quantity of heat is rendered sensible. In many cases, the volume of the substance crystallizing is enlarged, as in the instance of water, of iron, and of the greater number of salts; but in others the volume is diminished. Quicksilver, in congealing, contracts about a twenty-third part of its entire bulk, yet it exhibits the crystalline texture; and when the congelation is but partial, the crystalline figure can still be discovered: for the term crystallization, though at first confined by chemists to express the solidity of fluid bodies in a hyaline state, or state of colourless transparency, as ice and rock-crystal, is at present employed, as we have already observed, upon a much larger scale, and denotes, in general, the regular figures which bodies of all kinds assume when their particles have full liberty to combine, according to the laws of cohesion; a regularity of figure which is often occurring in the mineral kingdom, and disclosing the most beautiful and splendid appearances.

The access of light, like that of air, produces also a very remarkable effect. It is found, in general, that the crystals of salts are larger and better formed in the dark than when light falls upon the solution. But this relates only to such crystals as are formed in the fluid. In many, and indeed most salts, there are crystals formed, during the spontaneous evaporation of the solution, which rise above the surface into the air, either in contact with the sides of the vessel, or supported by their own structure. This phenomenon is very striking and curious, and it appears to have been well determined by experiments of Chaptal and others, that it does not take place without the presence of light.

Crystals produced from bodies dissolved in water always contain some part of the water, from the affinity between the water and the crystallizing material, and which hence passes with it into the concrete form. This is termed water of crystallization. Its quantity is very various; sometimes it equals or exceeds the weight of the solid; and sometimes amounts to not more than a few parts in a hundred. Much of the cold produced during the solution of salts in water, is owing to this water of crystallization returning to the fluid state: hence crystalline salts generally produce more cold than when they are uncrystallized. If the water of crystallization be expelled from a crystal, it loses its transparency, and at length its form. Crystals which part with their water of crystallization when exposed to the atmosphere are said to effloresce, and to deliquesce when they attract water and become humid.

Some substances have so strong an affinity for the fluids in which they are dissolved, or so little tendency for cohesion, that they do not crystallize. In some cases their crystallization may be effected by adding to the solution a substance exerting an affinity to the fluid, and of course weakening its affinity for the solid it dissolved.

As different bodies require very different quantities of water for their solution, it is possible when two such bodies are dissolved in one fluid, to obtain them separate by crystallization, the one which is least soluble, or most disposed to crystallize, first passing into the solid form; and by farther evaporation the other is obtained. A fact on this subject, somewhat singular, is noticed by Mr. Kirwan. If into a saturated solution of two salts in water a crystal of either be put, that salt crystallizes in preference to the other.

By crystallization also, salts, the solution of which is unequally promoted by heat, may be obtained separately from the same solution. Thus, if one salt be much more soluble in hot than in cold water, and another be equally soluble, or nearly so at any temperature, on evaporating the solution sufficiently, the latter salt will crystallize while the solution is hot; on cooling, the other will shoot into crystals; and by alternate evaporation and cooling, the two may be obtained uncombined, though generally with a little intermixture of each other.

Sometimes, however, when two salts are in solution in the same fluid, and have even different tendencies to crystallization, their mutual affinity leads them to crystallize in one mass, and even to assume a form different from that in which separately they would have crystallized.

In other cases this mutual affinity, between substances in solution, is sufficient to resist their crystallization, or to render it more difficult.

Crystallization is also, when applied to certain substances, produced by sublimation; for here likewise we have their integrant molecules set sufficiently at liberty, to assume a regular form, and we have this effect produced by the medium of caloric, as in the case of fusion. All solids that are easily volatilized without decomposition, at a moderate temperature, may in this manner be converted into a crystalline state. The sublimation, however, must take place in close vessels, and for reasons already advanced, must proceed gradually, and by no means be hurried. In this case, the caloric of the sublimed vapour passes through the pores of the containing vessel, as water through a filter; and the integrant molecules of the material employed being set at sufficient liberty, a stratum of particles in regular order, and of a definite figure, begins to be deposited on the inner surface of the containing vessel, which serve as a basis, to which all the succeeding ones attach themselves in the same mode of arrangement.

II. *Laws of Crystallization.*

The phænomena of crystallization were but little attended to by the ancient philosophers: the laws by which these are produced were neglected altogether. It was observed by Boyle, that crystals are produced by an aggregation of particles, but it still remained to be explained by what means the particles of different bodies unite in such a manner as to form regular figures? This regularity of figure was peculiarly noticed by Newton; but it remained for professor Haüy to unfold the very curious and recondite system of laws upon which this universal disposition to a regularity of figure

is founded, and by which, except when opposed by counteracting causes of greater power, it is uniformly accomplished. He has shewn very sufficiently, what had hitherto been rather conjectured than substantiated by Romé de Lisle and Bergman, that the primitive form, assumed by the crystal when in a mass, is exhibited in the external figure of every individual crystal of which the mass is composed, or at least that it lies within every such crystal as a nucleus, and may be extracted out of it by a skilful mechanical division. And he has at the same time rendered it highly probable, that the integrant particles of crystallizing substances always combine in the same body in the same way; or in other words, that the same faces, or the same edges, always attach themselves together; but that these differ in crystals produced from different substances. This, however, can scarcely be accounted for, without supposing that the particles of bodies are endowed with a certain polarity, which makes them attract one part of another particle, and repel every other part. This polarity will explain the regularity of crystallization; but it is itself inexplicable.

Upon this important subject, it would not be doing justice to the ingenious theorist, not to allow him to give his own explanation in his own way. To complete this article, therefore, we shall extract his highly interesting remarks on the primitive forms of crystals, on the forms of the integrant molecules of compound and crystallizable bodies, and on the laws to which the structure of crystals is subjected, from Gregory's Translation of his Traité Elementaire.

"*On the Primitive Forms of Crystals.*—It was remarked long ago that a great number of minerals, especially among those which have regular forms, are composed of laminæ, or thin slices, capable of being separated one from the others, in such manner that the fragments detached from these bodies by percussion have their faces plane, smooth, and more or less bright and sparkling.

"We give the name of mechanical division to the operation by which we are thus enabled to accomplish, as it were, the anatomy of a crystal, seizing, by the help of a sharp-edged instrument, such as a thin plate of steel, the natural joints of its constituent laminæ; and this operation executed upon all the minerals that favour the enquiry leads to a general result, which serves as a key to the theory of the laws relative to their structure. It consists in this, that if we divide the different original crystals of the same substance by corresponding sections over all the parts similarly situated, we shall come to the extraction of a regular solid, which is constant for all those crystals, even for those whose forms are most strongly contrasted. Two or three examples will suffice to make this easily comprehended.

"Let *abef* (Plate 53, fig. 1.) be the regular six-sided prism which is one of the varieties of carbonate of lime; it will be found that among the six edges *in*, *nc*, *cb*, &c. of the upper base, there are three which yield to the mechanical division. Let *in* be one of these latter edges; the mechanical division is made according to a plane *psut* inclined in an angle of 45°, both to the base *abcnih*, and to the plane *inef*. The two ridges *bc*, and *ah*, will admit of divisions analogous to the preceding, without its being possible to operate in a similar manner upon the three intermediate edges *cn*, *ab*, *ih*.

"It will be the complete reverse of this with respect to the inferior base *gfedrk*; for the edges of this base which will admit of the divisions, will be opposed to the non-divisible edges of the other base; that is to say, they will be the edges *de*, *gf*, *kr*. The plane *lqyz* represents the section made about this latter ridge. We shall therefore have six new planes laid open to us by these sections; and if we continue the division always parallel to these sections, until all the faces of the hexaëdral prism have disappeared, we shall arrive at a rhomboid, which is as the nucleus, and which the figure represents in its due position with regard to the prism. The great angle EAI of any one of the faces of this rhomboid, as found by computation, is 101° 32′ 13″.

"Every other crystal of the same species will, if divided mechanically, furnish an analogous result. It is merely requisite to find the direction of those sections that lead to the central rhomboid. Thus to obtain, at once, the nucleus of the dodecaëdron formed of scalene triangles (fig. 2.), the first plane must be made to pass through the two lines EO, OI; a second through the lines IK, KG; a third through the lines GH, HE, and nearly the superior moiety of the nucleus will then be discovered: three other sections made, the one by the lines OI, IK, another upon the lines KG, GH, and the last upon the lines HE, EO, will complete the disengagement of the nucleus. (See fig. 3.), which represents the nucleus inscribed in the dodecaëdron.

"Among the varieties of the same substance may be observed several rhomboids very different from the nucleus, as to the measure of their angles. But each of these rhomboids includes another which is still similar to the nucleus. For example, the rhomboid shewn at fig. 4, in which the angle at the summit is acute, and measured by 75° 31′ 20″, is subdivided by planes which intercept the terminal edges; namely, on one part *ns*, *us*, *ts*, and on the other part *ns′*, *us′*, *ts′*, making equal angles with the faces which they cut. The result is the obtuse rhomboid AA′, having the same angles as that which was drawn from the regular hexaëdral prism, and being so situated in respect of the circumscribing rhomboid, that its faces are parallel to the edges of the latter, as they ought to be from what has been said. That modification of a form which seems as a disguise to itself, has perhaps something still more surprising than the diversities which render other forms like foreigners with respect to their nucleus.

"If a crystal of another species be taken, the nucleus will be found changed; if it be still a rhomboid, its angles will be different. In such a species it will be a cube, in such another it will be a right prism, with its bases rhombi, &c. We shall call primitive forms the forms of those solids which are each inscribed in all the crystals that belong to the same species; and secondary forms those which differ from the primitive form. This latter is also sometimes immediately produced by crystallization.

"The known primitive forms are six in number, namely, the tetraëdron, which in this case is always regular; the parallelopiped, which is sometimes rhomboidal, sometimes cubic, &c.; the octaëdron, whose surface is composed of triangles, which are, according to the species, equilateral, isosceles, or scalene; the regular hexaëdral prism; the dodecaëdron bounded by equal and similar rhombi; and the dodecaëdon composed of two right hexaëdral pyramids united at their bases. The hexaëdral regular prism, which appears here

among the primitive forms, becomes, as we have seen, a secondary form relatively to carbonate of lime; and this is not the only example of that faculty possessed by the same solid of doubling itself in some sort by the variety of its functions.

"*Forms of the Integrant Moleculæ.*—We have hitherto confined ourselves to the consideration of the nucleus; since this result of the mechanical division, being a kind of constant quantity relative to all the crystals of the same species, becomes a commodious datum for the theory, which proceeding from this constant quantity, has only to determine the variable quantities, that is to say, the several modes of arrangement of the moleculæ situated in the parts that serve to envelope the nucleus.

"But before we can pass to the laws of this arrangement, we must ascertain the kind of moleculæ which are proposed for investigation; and it is by the subdivision of the nucleus by slices parallel to its different faces, and sometimes in other directions still, that we attain this knowledge.

"We will suppose, at first, that the nucleus is a parallelopiped, which has no other natural joints than those which are parallel to its faces, and we shall choose for example the rhomboid of the carbonate of lime. The subdivision of this rhomboid by planes, always more nearly approaching towards each other, will give rhomboids similar to it, and which successively diminish the original volume; and if this division were continued mentally beyond the term where the little solids would become insensible to the eye, the rhomboids would be brought to such a degree of tenuity, that we could not divide them any farther without analyzing them, that is, without destroying the union of the chemical principles which compose them. These rhomboids situated, in a certain sense, upon the limit of the mechanical division, are what we call the integrant particles of carbonate of lime, to distinguish them from the elementary moleculæ of the same substance, which are, on one part, those of the lime, and on the other, those of the carbonic acid.

"For a second example we will take the dodecaëdron with rhombal planes (fig. 5.), which can be no other way divided than parallel to its faces. I say that in this case the integrant particle will be a tetraëdron. To prove this, we shall remark that any one whatever of the edges of the dodecaëdron is parallel to two opposed faces of that solid. Thus the edge *ol* is parallel to the faces *rsyx*, *puzh*; the edge *pu* is parallel to the faces *olrs*, *ahzq*, and so of others: on the other hand, any one whatever of the small diagonals of one of these rhombi is also parallel to two opposed faces; for example, the small diagonal passing through the points *o*, *t*, is parallel to the faces *rsyx*, *puzh*. Therefore if we would subdivide the dodecaëdron parallel to its different faces, by causing, for more simplicity, the cutting planes to pass through the centre, these planes, taken three and three, will always pass through a small diagonal, such as *ot*, and by two edges contiguous to that diagonal, such as *os*, *ts*, or else *ou*, *tu*; that is to say, these planes will intercept two isosceles triangles *ost*, *out*, upon the surface of each rhombus *ostu*: but it will pass at the same time through the centre; therefore it will detach tetraëdrons, whose number will be 24, that is to say, double the number of faces. The sixth figure represents separately the tetraëdron, whose exterior face is the triangle *ost*, and it may be demonstrated that the four faces of each tetraëdron are equal and similar isosceles triangles: it is indeed a consequence of the equality and similitude which exists between the rhombi of the primitive form itself.

"The regular hexaëdral prism which we shall select for our third example, in like manner only admits of subdivisions in directions parallel to its different faces: it will suffice to cast a slight look at fig. 7, where are traced, on the regular hexagon representing the base of the prism, lines indicative of the subdivisions, to conceive that the form of the moleculæ is, in this case, an equilateral triangular prism.

"Lastly, we will consider one of the primitive forms, the subdivision of which is not limited to parallelism with the faces. Such is the right rhomboidal prism represented Plate 53, fig. 8, which appertains to a substance named staurotide (the cross-stone or the granatite of Vauquelin), which is found in the department of Finisterre, in France, where its crystals commonly cross one another two by two. This prism, besides the division parallel to the faces MM, and the base P, admits of others parallel to a plane which would pass through the small diagonal AA, and through that of the opposite base; whence it follows that the integrant moleculæ are here also triangular prisms, but such as have isosceles triangles for their bases.

"Now, that we may better recur to the remarkable consequence deduced from the subdivision of primitive forms, in relation to the number and to the forms of the integrant particles, let us imagine that it is proposed to determine generally the three most simple geometrical solids. As there must be at least four planes to circumscribe a space, it is evident that the required solids will be successively terminated by four, five, and six planes; and by selecting from each kind of solid the most simple, we shall have first the triangular pyramid or the tetraëdron, next the triangular prism, and lastly the parallelopiped. But such are the three elementary figures which give rise to that great diversity of crystals presented by nature to our observation. Here we perceive that which we may call nature's familiar device, economy and simplicity in the means, riches, and inexhaustible variety, in the effects produced.

"The three forms now under contemplation are diversified in the different minerals, by the measures of their angles, and by the respective particular dimensions determinable by the theory, and it is principally on these differences that the distinction of mineral species is founded.

"But a consideration on which we know not how to insist too much, is that in all the series of crystals which the theory refers to the same primitive form, by the aid of laws of which we shall soon speak, the form of the particle is invariable, relatively to the measure of its angles and to its respective dimensions; and this constancy, which is demonstrated by facts on which it will be enough merely to cast the eyes, and by computations closely connected with those facts, subsists in the midst of all the diversities that modify the composition of a substance. When in the same series of crystals this is limpid and without colour, while that contains a colouring principle, and a third yields by analysis a certain quantity either of iron, or of any other matter of which the other crystals do not furnish the least trace: still there exists one principle common to all the individuals, which is found in excess in some of them, and all

Fig. 1.

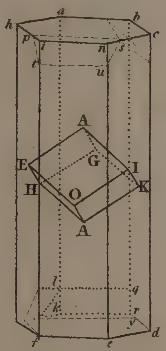


Fig. 2.

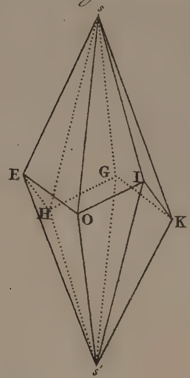
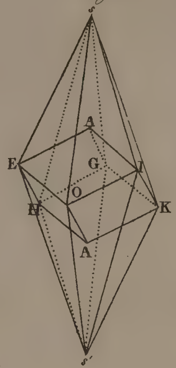


Fig. 3.



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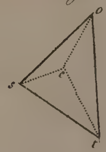

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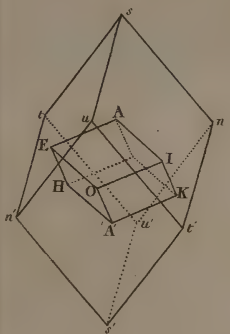

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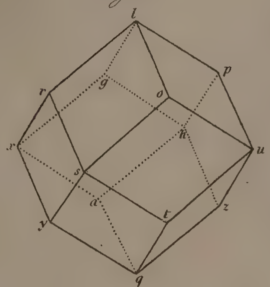

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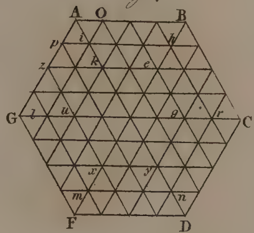

Fig. 9.

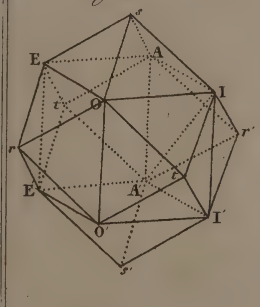

Fig. 8.

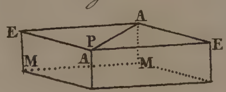

Fig. 10.

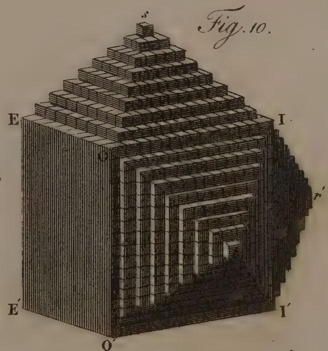

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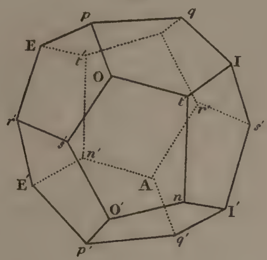
Fig. 1.



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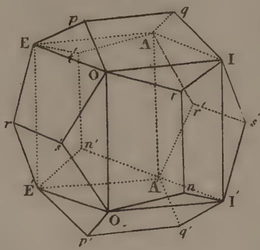

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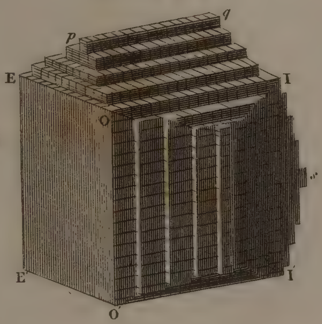

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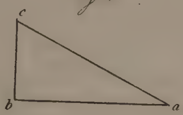
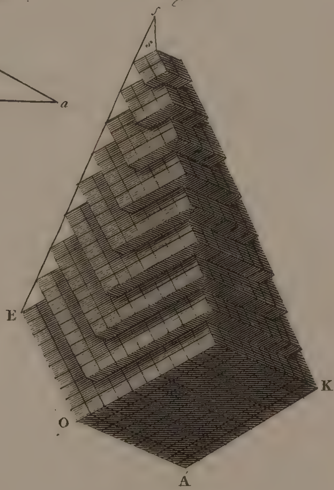


Fig. 5.



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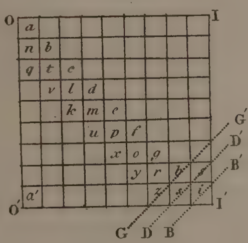

Fig. 7.

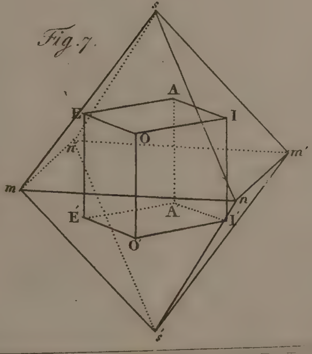

Fig. 8.

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those variations, whatever may be their cause, do not even slightly affect the geometrical form of the integrant particle: that stands as a fixed point about which all the rest seems to oscillate. If therefore there be here a problem to resolve, it is not that which consists in explaining how the constancy of the moleculæ may agree with the changes which intervene in the composition, but those whose object is to reconcile these changes themselves with the immutability which we cannot avoid granting to the form of the moleculæ.

"The divisions which we have considered in the nucleus extend equally to all the surrounding matter; whence it follows that the entire crystal is nothing else than an assemblage of integrant particles, similar to those of which the nucleus itself is constituted. We shall suppose that these moleculæ are the same that were suspended in the fluid where the crystallization is accomplished, though we cannot be physically certain of this, since they escape our sight in consequence of their extreme tenuity; but in the study of nature we cannot proceed more wisely than by adopting this principle, that things are considered such in themselves as they offer themselves to our observations. The ultimate perceptible results of the mechanical division of minerals, even if they do not give the figure of the true integrant articles, still deserve so much the more to be deposited in our conceptions, as the assuming them for data enables us to represent faithfully the facts presented to us by nature, and to establish their connection and mutual dependance.

"The theory which relates to this object consists in investigating the laws followed by the moleculæ in their arrangement, to produce those species of regular coverings which disguise the same primitive form in so many different fashions.

"*On the Laws to which the Structure of Crystals is subjected.*—If we consider attentively the figures of the plates which successively cover again the nucleus of a crystal, and which we shall call laminæ of superposition, it will be perceived that proceeding from the nucleus they go on by a progressive diminution, sometimes on all sides at once, sometimes in certain parts only. But the difference between each lamina and that which precedes it, can only arise from the retrenchment of a certain quantity of integrant particles that are taken from the first till it is equal to the second; and since the edges of the decreasing laminæ are constantly right lines parallel one to another upon the different laminæ, it results that the differences of which we have spoken are measured by the subtractions of one or many ranges of integrant particles. This, therefore, is the enunciation of the problem presented for solution: a secondary crystal being given, and the figure of its nucleus and of its integrant particles being likewise given; supposing, moreover, that each of the laminæ that will be added to the nucleus does not project so far as the preceding, in certain parts, by a quantity equal to one, two, three, &c. ranges of moleculæ; to determine among the different laws of diminution those from which a similar form to that proposed will result, with respect to the number, the figure, and the disposition of its faces, and to the measure of both its plane and solid angles.

"This sort of problems can only be resolved by the aid of a rigid calculus; but to facilitate the comprehension of the manner of operation of the laws that serve to determine the results, we shall proceed to construct, by the method of synthesis, some secondary forms, thus rendering palpable, so to speak, the superposition and the variations of the decreasing laminæ superadded to the nucleus.

"We shall commence with an example quite elementary, drawn from the dodecaëdron having rhombal planes (fig. 9.), which we have before seen ranks among the primitive forms, but which we shall here consider as a secondary form, whose nucleus is a cube. To extract this nucleus it will suffice to take off successively the six solid angles, as *s*, *r*, *t*, &c., each composed of four planes, by cuts directed in the sense of the minor diagonals. These cuts will lay open six squares, AEOI, EOO′E′, IOO′I′, &c., which will be the faces of the primitive cube.

"This cube, being an assemblage of integrant particles of the same form, it will be necessary that each of the pyramids reposing on its faces be itself composed of cubes equal to one another, and to those which constitute the nucleus. But this condition will be fulfilled, if the first plate situated at the base of any one whatever of the six pyramids, have towards each of its edges one range of cubes less than in the case where it would entirely cover the face of the nucleus on which the pyramid rests; and if each of the other laminæ be in like manner diminished at each border of the preceding one, by a quantity equal to one range: for, it is very evident that, in this case, all the laminæ will be composed of cubes solely. This arrangement is represented by fig. 10, where it may be seen that the last laminæ is reduced to a single cube *.

"This figure is constructed on the hypothesis wherein the nucleus has seventeen moleculæ on each of its edges; and as the laminæ of superposition diminish by one range towards each of their opposite borders, it follows that the lengths of those edges are successively as the numbers 15, 13, 11, 9, 7, 5, 3, 1, which makes eight laminæ for each pyramid. The triangular faces O*s*I, O*t*I, &c. of these pyramids are produced by the diminishing edges of the laminæ of superposition which are obviously found on the same plane; so that they are alternately re-entering and salient.

"But there are six pyramids, and consequently twenty-four triangles. Now, since the diminution is uniform throughout the extent of the adjacent triangles upon the contiguous pyramids, such as O*s*I, O*t*I, it results that the triangles, taken two by two, form a rhombus.

"The surface of the solid will therefore be composed of twelve equal and similar rhombi, that is to say, this solid will have the same form as that which is the object of the problem. The obtuse angle of each rhombus is measured by 109° 28′ 16″ †, and the inclination of any two rhombi whatever, respectively adjacent, is 120°.

"Now if for this kind of gross masonry, but which possesses the advantage of speaking to the eyes, we substitute the infinitely delicate architecture of nature, it will be necessary to conceive the nucleus as being composed of an incomparably greater number of imperceptible moleculæ; then

* "In the figure only three of the pyramids are superadded to the nucleus; it is easy to supply the others mentally.

† "This is a consequence of this that the ratio between the gaeater and less diagonals of each rhombus, is that of $\sqrt{2}$ to 1.

the number of laminæ of superposition being itself onsiderably augmented, while the thicknesses of those laminæ will have become imperceptible, the channels which those laminæ form by the re-entering and salient alternative of their borders will likewise escape our senses; and it is this which obtains in the polyedræ that are formed so easily by crystallization, without being either pressed or disturbed in its progress.

"To enunciate the result which we have been describing, we say that the dodecaëdron is produced in virtue of a diminution by a single row or range, parallel to all the edges of the cubic nucleus.

"If it be imagined that the laminæ of superposition decrease by two, three, or more ranges, and always parallel to the different edges of the primitive cube, then the pyramids being more flattened, their faces can no longer be found two by two in the same plane; so that the surface of the solid will then be composed of twenty-four distinct triangles.

"We shall call decrements in breadth, those where each lamina having only the thickness of one particle, as in the case we have just cited, suffers an abstraction from the preceding one, by a quantity equal to two, three, or more ranges. The decrements in height are those which present the inverted effect, that is to say, where each lamina suffering only an abstraction from that which precedes of a quantity equal to one range, may have a height double, or triple, or quadruple, &c. of the thickness of a particle. The limit of these two species of decrements has place when the difference in breadth and the dimension in height are both equal to the unit, as in the dodecaëdron with rhombal planes originating from the cube.

"The dodecaëdron from sulphurets of iron (ferruginous pyrites), the surface of which is composed of twelve equal and similar pentagons, as may be seen in Plate 54, fig. 1, offers us a combination of the two species of decrements we have been speaking of. Each pentagon, such as *tOsO'n*, has four equal sides, namely *Ot*, *Os*, *O's*, *O'n*; the fifth *tn*, which we shall consider as the base of the pentagon, is longer than the others. The dodecaëdron, which is here the subject of enquiry, has again a cube for its nucleus, at the extraction of which we should arrive by causing the cutting planes to pass through the diagonals OI, OE, AE, AI, &c. (fig. 2.), which intercept the angles opposite to the bases; whence it appears that the portions superadded to the nucleus, instead of being pyramids, as in the dodecaëdron with rhombal planes, are a species of wedges that have for exterior faces two trapezoids, such as *OIqp*, *AEpq*, and two isosceles triangles *EpO*, *AqI*.

"Each of these additional parts, that, for example, which we have just pointed out, results from two decrements, the one through two ranges in breadth parallel to the two opposite edges OI, AE, of the corresponding face AEOI of the nucleus, the other through two ranges in height, parallel to the two other edges EO, AI, of the same face: moreover, each decrement acts upon the different faces of the cube according to three directions respectively perpendicular. Thus the decrement through two ranges in breadth obtains upon the face AEOI, parallel to OI, and AE, as we have said, acts upon the face OII'O', parallel to OO' and II', and upon the face EOO'E', parallel to EO and O'E; and in the same directions upon the opposite faces. The progress of the decrement in height through directions which intersect it also at right angles, is presented to the mind of itself, after the elucidation just given.

"On considering attentively the third figure, where we have rendered sensible to the eye the distinction of laminæ of superposition and the moleculæ of which they are the assemblage, it will be seen that the progress of the decrement in breadth, which contributes for example to the formation of the additional part *EOIqp*, and which takes place parallel to the edge OI and to its opposite, being more rapid than that of the decrement in height, which is made parallel to the edge OI and to its opposite, the two faces that spring from the former must be more inclined than those which are produced by the second; in such sort that each pile of decreasing laminæ no longer terminates in a point, but in an edge *pq*: moreover, each trapezoid, such as *Opql* (fig. 2.), which results from the decrement in breadth, being upon the same plane with the triangle *OtI*, in consequence of this that the decrement in height which determines the latter is only the repetition in a contrary direction of the decrement in breadth, the aggregate of the two figures forms a pentagon *pOtIq*; whence it follows that the secondary solid is terminated by twelve equal and similar pentagons, by reason of the regular figure of the nucleus, and of the symmetry of the decrements.

"If it be supposed that the decrements act according to two other laws, one of which is always the inverse of that which is combined with it, in such a manner that there shall be three, or four, &c. ranges, subtracted in breadth and as many in height, the result will still be a dodecaëdron of twelve equal and similar pentagons; and it is very evident that all these dodecaëdrons will differ, either from one another, or from the preceding dodecaëdron, by the measure of their angles. In order that the law on which we have made the latter inference depends may be demonstrated, it is necessary that the inclination * of each pentagon, as *tOsO'n*, upon the pentagon *tIs'I'n*, which has the same base *tn*, when measured upon the natural dodecaëdron, be equal to that which is determined by the calculus, taking for a datum the law now under consideration, and which inclination is 126° 52' 8"†: but, the goniometry (the actual measure of the angle) gives sensibly 127°; whence it must be concluded that the first measure is the limit to which the instrument would of itself reach, were it not for the little imperfections, which do not permit it to offer us more than approximations. What is here remarked obtains equally in all the other applications of the theory: every law of decrement furnishes its respective result, the agree-

* "It may be easily conceived that the inclination to which we have given the preference, determines all the other angles.

† "To find this inclination nothing more is requisite than to resolve a right-angled triangle *abc* (Plate 54, fig. 4), in which the side *ab* is to the side *bc*, as the distance between the edge of one lamina and that of the following, given by the decrements in breadth, is to the thickness of each lamina, that is to say, as two to one. The angle *acb* will be the half of the inclination sought.

"The angle *acb* is obviously that whose tangent is double the radius, which by inspection in any table of natural tangents is at once seen to be rather more than 63° 26'.

ment of which with that of observation is full as satisfactory as can reasonably be desired.

"The solid, the structure of which we have been explaining, has been taken for a regular dodecaëdron similar to that of the geometers, since persons were led to attribute to crystals the forms that appeared the most simple and the most regular, when a polyedron is considered merely in its aspect, and as the phantom of a physical body; but the theory demonstrates that the existence of a regular dodecaëdron is not possible in virtue of any law of decrement. The reason is, that the ratio of the quantity of which each lamina is deprived by the following in the direction of its breadth, to the thickness of the same lamina, must always be represented by rational numbers; which obtains effectively in the dodecaëdron of sulphuret of iron, where this ratio is that of two to one: on the contrary, the ratio between the two corresponding dimensions in the regular dodecaëdron is expressed by irrational numbers, that is to say, it represents an impossible thing *. But the defect of symmetry existing in the exterior of the dodecaëdron of sulphuret of iron conceals a character of simplicity, which consists in this, that the particle being a cube whose figure is remarkable for its perfection, the law of the decrement is, at the same time, that which produces the dodecaëdron by the aid of the least possible number of subtractive ranges; thus it may be truly said that it is the regular dodecaëdron of mineralogy.

"We shall terminate that which regards decrements on the edges, by an example drawn from the dodecaëdron, whose faces are scalene triangles (Plate 53, fig. 2), which is, as we have seen, one of the varieties of carbonate of lime. Here the nucleus is a rhomboid, the axis of which, that is to say, the line passing through the two solid angles A, A′ (fig. 3), composed each of three equal obtuse angles, must be situated vertically, that this rhomboid may be presented to the eye under its true aspect; it results, that symmetry does not require as with respect to the cube, that the decrements operating on any one EO of the edges of one of the faces, as AEOI for instance, should be repeated on the opposite edge AI; since the latter, which is contiguous to one of the summits, has in some measure a mode of being different from the other. It is enough that all which takes place with regard to the edge EO obtains equally in respect of the five others, OI, IK, KG, GH, HE, similarly situated. One may judge, solely from an inspection of the figure, that these six edges, which are common to the nucleus and to the secondary crystal, serve as lines of departure to so many decrements, the effect of which is to produce on the two sides of the same edge, such as EO, two triangles E*s*O, E*s*′O; thus making in all twelve triangles, six towards each summit.

"But it is demonstrable by the calculus that, in the present case, the decrements are made through two ranges in breadth, as may be seen fig. 5, Plate 54, which is limited to the tracing the species of the superior pyramid added to the nucleus. The salient and re-entering alternatives that are formed by the laminæ of superposition towards their decreasing edges, being nothing as to sense in the crystal produced by nature, the line E*s* will represent one of the edges contiguous to the summit, such as it will be seen on the same crystal; the difference between the geometrical summit *s*, and the physical summit *s*′, vanishing by reason of the extreme minuteness of the particles.

"While the laminæ of superposition diminish towards their inferior borders, they augment on the contrary towards their superior borders; and it is a general principle that the portions of the laminæ situated out of the reach of the decrements extend themselves, as if they were to make the nucleus while it retains its form simply augment in volume. But the theory drops the consideration of these subsidiary variations, to contemplate only the immediate effect of the decrement, which alone determines all the rest.

"One result which obtains generally for all the dodecaëdrons produced in virtue of the same law, whatever are the primitive angles, consists in this, that the axis of each of these dodecaëdrons is triple the axis of the nucleus, and in this likewise, that the ratio of the solidities is the same as that of the axes: moreover, it is found by means of computation, that in the particular dodecaëdron now the subject of enquiry, the great angle OE*s* (fig. 3, Plate 53), of each of the faces is strictly equal to the obtuse angle EAI of the nucleus (that is to say, 101° 32′ 13″); and that the incidence of the two contiguous faces OI*s*, KI*s*, upon the dodecaëdron, at the place of one of the most salient edges I*s*, is equal to that of the two faces likewise adjacent EAIO, GAIK, towards the same summit of the nucleus, namely, 104° 28′ 40″. It is this that has suggested the name of metastatic, which has been given to this variety, and which indicates the transference, as it were, of the angles of the nucleus to the secondary crystal. The solutions of problems relative to the structure of crystals have served to unveil a multitude of similar properties, and of results of a geometry which would appear worthy of being attentively studied, even when it carries us no farther than its simple speculations: but this study presents a double interest, when those properties, of which it furnishes the developement, have a real foundation in the geometry of nature.

"Independently of the decrements which have place parallel to the edges of the faces of the nucleus, others are made also in directions parallel to the diagonals; and as they have the angles for terms of departure, we shall call them decrements on the angles.

"Let OII′O′ (fig. 6, Plate 54), be one of the faces of a cubic nucleus, subdivided into a multitude of little squares, which will be the bases of so many moleculæ. The ranges or rows of moleculæ may be considered, not only in the direction of the edges, as the range lying in the direction *aa*′, but also in the order of the diagonals, as the ranges, one of which is denoted by *a*, *b*, *c*, *d*, *e*, *f*, &c., another by *n*, *t*, *l*, *m*, *p*, *o*, *r*, *s*, a third by *q*, *v*, *k*, *u*, *x*, *y*, *z*, &c.; the only difference is, that here the moleculæ of the same range merely touch by an edge, instead of which those that compose the ranges parallel to the edges touch one another by one of their faces. We shall limit ourselves to a single example of decrements on the angles.

"The seventh figure represents a regular octaëdron, having a cubic nucleus, the solid angles of which (as may be seen in the figure) correspond to the centres of the faces of the octaëdron:

* "This ratio is that of $\sqrt{3+\sqrt{5}}$ to $\sqrt{2}$, as it will be easy for geometricians to assure themselves; and the measure of the angle formed by the two adjacent faces, is 116° 33′ 32″, instead of 126° 52′ 8″.

in this case the laminæ of superposition diminish by one range over the angle of the faces of the cubic nucleus; it results with regard to the angle I′ (fig. 6), which we have selected for an example, that the cube which answers to *i* is taken away by the first lamina, that in the second there will be an abstraction of two cubes, answering to *s*, *s′*; in the third, those which correspond to *z*, *b*, *z′*, and thus throughout; so that the edges situated on the same side, upon the different laminæ, succeed in right lines, such as BB′, DD′, GG′, &c.

"Now from the principle that wherever the decrement does not operate, the crystal augments itself on the contrary, as if the nucleus had only to increase its volume, the laminæ of superposition extend themselves towards the parts situated between their decreasing edges, in such a manner as to envelope them mutually until the decreasing edges of the same lamina come to touch one another; there then remains only the effect of the decrements, which continue their progress until they have arrived at their limit.

"Each of the eight solid angles of the cube will therefore become the point of departure of three decrements, which will have place upon the three planes that concur in the formation of that angle, whence it follows that there are in all twenty-four faces produced in virtue of the decrements. But since the decrements obtain by a simple range, it will again happen here that the three faces which arise about the same solid angle are on a level, and thus the twenty-four faces are reduced to eight; and, in consequence of the regular form of the nucleus, the secondary octaëdron is itself regular. This structure is that of a variety of sulphuret of lead, known commonly under the name of galena.

"In the same case, and in general in all those which have a relation to the decrements on the angles, the faces of the secondary solid are no longer furrowed by small channels, as when the decrements are made on the edges; they are thick-set with a number of salient protuberances, formed by the exterior solid angles of the moleculæ: but all these angles being on a level, and the moleculæ being besides imperceptible, the faces of the crystal appear to form smooth and continued planes.

"The eighth figure of Plate 54 represents the assortment of little cubes that concur to produce one of the faces *smn* (fig. 7), of the octaëdron we have been speaking of. The cube *o* (fig. 8), is situated at the solid angle of the nucleus marked with the same letter (fig. 7). The cubes whose faces are traversed diagonally by the lines *bc*, *cr*, *rb* (fig. 8), appertain to the three first laminæ of superposition which repose on the faces of the cube adjacent to the angle *o*; those which are crossed diagonally by the lines *ld*, *dg*, *gl*, appertain to the three following laminæ. Beyond this term the diminishing edges touch one another in such manner that each lamina takes the figure of a square, of which the side contiguous to the face *smn* is *ku*, *xy*, or *bz*; and all proceed then by laminæ of this same figure, which go on diminishing on all sides at once, to the summits *s*, *m*, *n*, of the octaëdron, where the laminæ are each reduced to a single cube.

"The laws of the decrements are susceptible of certain modifications, which offer a kind of medium terms between those we have spoken of; but this is not the place to exhibit them, because our design has merely been to expound the general principles of the theory, and to give an idea of the most usual results to which the application of these methods may be extended.

"We have confined ourselves also to the consideration of those forms which depend upon a single law of diminution, and which we call simple secondary forms. But crystallization very frequently presents forms which we term compound, and of which the faces are produced by the concurrence of several laws of decrement; when some one of these laws does not attain its limit, its effect remaining as it were interrupted, the secondary presents faces parallel to those of the nucleus, interposed between the little faces which are due to the decrements.

"What combinations are comprised in the numerous modifications of these laws, which by turns separate over different bodies, and exhibit in the same body the assemblage of many forms, acting sometimes in preference upon certain edges or certain angles; at others, on edges and angles at once, multiplying equally by the diversity of their measures, and by that of their terms of departure; sometimes completely disguising the nucleus; at others, permitting its image to subsist, and making the constant positions of its faces serve as a basis for new variations! And if it be supposed that the number of subtractive ranges are themselves variable, and that there may obtain decrements by 20, 30, 40, or more ranges, the imagination will be staggered at the immense quantity of regular bodies with which only one substance might people the subterranean world; but the force which produces the subtractions appears to have a very limited action, and hitherto we have not discovered any laws whose measure exceeds six ranges. Nevertheless such is the fecundity which is allied with this simplicity, that when limited to ordinary decrements by one, two, three, and four ranges upon the edges and upon the angles of a rhomboid, it may be demonstrated that this species of nucleus is susceptible of producing eight millions, three hundred eighty-eight thousand, six hundred and forty (8,388,640!) varieties of different forms, while the number of those which have been hitherto observed extend but little beyond sixty, even relative to carbonate of lime, which is deemed the proteus of minerals.

"We shall not enter here into any details respecting the structure of the secondary forms, whose particle is a tetraëdron or a triangular prism; but we believe we cannot terminate this subject better than by the exposition of a result which serves to connect this structure with that of the native forms of the parallelopiped. The connexion we now advert to consists in this, that the tetraëdral, or the triangular prismatic moleculæ, are always so assorted in the interior of the primitive form and of the secondary crystals, that, taking them by little groups of two, four, or six, they compose parallelopipeds; so that the ranges taken away by the effect of the decrements, are nothing else than sums of these parallelopipeds.

"Thus in the regular hexaëdral prism, of which the hexagon ABCDFG (fig. 7, Plate 53), represents the base subdivided into triangles, which are the bases of so many moleculæ, it is evident that any two contiguous triangles, such as *Api*, *AOi*, compose a rhombus; and, consequently, that the two prisms to which they belong, form, by their re-union, a right prism having rhombal bases, which is one of the species of parallelopipeds.

"Let us suppose a series of laminæ piled upon the hexagon ABCDFG, and which undergo upon

their different edges, for example, substractions whose measure is such that these same edges become successively in the relative position of the sides of the hexagon *ilmnrh*, *kuxyge*, &c. the effect will be the same as that of a decrement by a range of little parallelopipeds, each composed of two moleculæ. It may be conceived that in the same case the result of the decrement is a right hexaëdral pyramid, whose base stands upon the hexagon ABCDFG.

"Recurring again to the dodecaëdron with rhombal planes (fig. 5), which we have seen is an assemblage of tetraëdrons, whose faces are equal and similar isosceles triangles: if we divide the twelve rhombi into four assortments, each constituted of three planes, such as those which are reunited to form any one of the four solid angles *o*, *y*, *x*, *g*, we may consider each assortment, that for instance which comprises the three planes *olrs*, *outs*, *olpu*, as appertaining to a rhomboid which should have one of its summits situated exteriorly in *o*, and of which the other summit, engaged in the dodecaëdron, should be confounded with its centre. But it is very obvious, that, on this hypothesis, the twenty-four tetraëdrons, of which the dodecaëdron is the assemblage, effect a junction, six by six, to form the four rhomboids which have their exterior summits at the points *o*, *y*, *x*, *g*. It follows as a necessary consequence, that if we suppose the mechanical division pushed to its limit, all the tetraëdral moleculæ corresponding to that limit, grouped in like manner, six by six, will give rhomboids. But it is by making the laminæ of superposition decrease by one or by several ranges of these rhomboids, that the theory attains to the determination of the secondary forms of substances which, like the granate, have the dodecaëdron with rhombal planes for the primitive form.

"We have given the name of subtractive particles to those parallelopipeds composed of tetraëdrons, or of triangular prisms, the ranges of which measure the quantity of the decrement experienced by the laminæ of superposition. The calculus need only attend to these parallelopipeds to arrive at its object; and the kind of dissection afterwards undergone by these little solids, when we endeavour to attain the true form of the integrant particle, is an affair of pure observation, foreign from the theory. The parallelopiped here represents the unit of the fractions formed of its subdivisions. By means of this conformity between the results given by the various forms of integrant particles, the theory has the advantage of being able to generalize its object, by referring to the same element that multitude of forms which, by their diversity, would seem little susceptible of concurring in a common point."

CTESIBIUS, a mathematician of Alexandria, who flourished 135 B.C. He invented the pump, and a clepsydra, or water-clock. He is not to be confounded with Ctesibius of Chalcis, a cynic philosopher.

CUB. *s.* (of uncertain etymology.) The young of a beast; generally of a bear or fox (*Shakspeare*). 2. The young of a whale (*Waller*). 3. In reproach, a young boy or girl (*Shakspeare*).

To CUB. *v. a.* (from the noun.) To bring forth (*Dryden*).

CUBA, an island belonging to the Spaniards, situated in the Caribbean sea, between 74 and 87 deg. W. lon. and between 20 and 23 deg. N. lat. It is near 700 miles long from E. to W. and generally about 70 miles broad. A chain of hills runs through the middle of the island, but the land near the coast is, for the most part, a level champaign country, well watered with rivulets, and always flooded in the rainy season, when the sun is vertical. There are scarcely any of the rivers navigable; they run a short course from the hills into the sea. There are several good harbours in the island. The chief are those of St. Iago, towards the E. end of the island; Cumberland harbour further E. and the Havannah, at the N.W. part of the island. Such animals as are found under the same parallel of lat. are to be met with here. The hills are pretty well planted with timber. The soil produces maize, cassava-root, tobacco, sugar, hides, cotton, indigo, ginger, aloes, and long-pepper; but neither European wheat, hemp, flax, nor vines, will thrive in Cuba. The English landed on the S.W. part of the island in 1741, under the conduct of admiral Vernon, who did not succeed. It was, however, taken by the earl of Albermarle, in 1762, but it is at present in the possession of the Spaniards. The galleons, which return annually to Old Spain, rendezvous at the Havannah on this island.

CUBÆA. In botany, a genus of the class decandria, order monogynia. Calyx turbinate, five-parted, unequal: corol five petalled, nearly equal, stamens inserted into the calyx; the three upper ones shorter; legume villous, six or seven-seeded. Two species; both natives of Guinea: one with pinnate leaves, alternate leaflets; a tree sixty feet high, with spiked, terminal flowers. The other smaller.

CUBA'TION. *s.* (*cubatio*, Latin.) The act of lying down.

CU'BATORY. *a.* (from *cubo*, Latin.) Recumbent.

CU'BATURE. *s.* (from *cube*.) The finding exactly the solid content of any proposed body (*Harris*).

CUBE. *s.* (from κυβος, a die.) A regular solid body, consisting of six square and equal faces or sides, and the angles all right, and therefore equal.

CUBE (Duplication of). See DUPLICATION.

CUBES, or CUBIC NUMBERS, are formed by multiplying any numbers twice by themselves. So the cubes of

1, 2, 3, 4, 5, 6, &c.
are 1, 8, 27, 64, 125, 216, &c.

Peletarius, among various speculations concerning square and cubic numbers, shews that the continual sums of the cubic numbers, whose roots are 1, 2, 3, &c, form the series of squares whose roots are 1, 3, 6, 10, 15, 21, &c.

Thus,
$$1 = 1 = 1^2,$$
$$1+8 = 9 = 3^2,$$
$$1+8+27 = 36 = 6^2,$$
$$1+8+27+64 = 100 = 10^2, \text{ \&c.}$$

Or, in general,
$$1^3+2^3+3^3+4^3 \text{ \&c. to } n^3 = \overline{1+2+3+4\ldots n}|^2 = \overline{\tfrac{1}{2}n.\, n+1}|^2.$$

It is also a pretty property, that any number, and the cube of it, being divided by 6, leave the same remainder; the series of remainders being 0, 1, 2, 3, 4, 5, continually repeated. Or that the differences between the numbers and their cubes, divided by 6, leave always 0 remaining; and the quotients, with their successive differences, form the several orders of figurate numbers.

The third differences of the cubes of the natural numbers are all equal to each other, being the constant number 6.....A cube number may end in any of the natural numbers, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 0...... It is impossible to find two cubes whose sum or difference is a cube.... But, a number composed of two cubes being given, it is possible to find two other cubes, the sum of which shall be equal to the former two. Thus, Father de Billy, by following the method of Fermat, found that the sum of the two cubes 8 and 1, might be divided into two other cubes whose sides were $\frac{1243617773299097836481}{60962383566137297449}$ and $\frac{487267171714352336560}{60962383566137297449}$.... It is also possible to find three cubes, which, taken together, shall be equal to a fourth: the least whole numbers fulfilling these conditions, are the cubes of 3, 4, and 5, which added together make 216, the cube of 6.

On the subject of cubes, see Euler's, Kersey's, and Fermat's Algebra; also the works of Father de Billy, Ozanam, and the Commentary of Bachet de Meziriac on Diophantus.

Cube root, or Cubic root, the origin of a cubic number; or a number by whose multiplication into itself, and again into the product, any given number is formed. To extract the cube root, see the treatise on Arithmetic, in the first volume.

CUBEBÆ. (from *cubabah*, Arab.). Piper caudatum. Cubebs. The dried berries of the piper cubeba; foliis oblique ovatis, seu oblongis venosis acutis, spica solitaria pedunculata oppositifolio, fructibus pedicellatis, of Linnéus. They are of an ash-brown colour, generally wrinkled, and resembling pepper, but furnished each with a slender stalk. They are a warm spice of a pleasant smell, and moderately pungent taste; and may be exhibited in all cases where warm spicy medicines are indicated.

CUBEBS. See Cubebæ.

CU'BIC. Cu'bical. *a.* Having the form or properties of a cube.

Cubic equations, in algebra, those in which the unknown quantity rises to three dimensions, as $x^3=a$, or $x^3+ax^2=b$, or $x^3+ax^2+bx=c$; and they reduce to this form $x^3+px=q$, by taking away the second term. Cubic equations have three roots, either all real, or else one real and two imaginary. The nature of the roots, as to real and imaginary, is known partly from the sign of the co-efficient p, and partly from the relation between p and q: for the equation has always two imaginary roots when p is positive; it has also two imaginary roots when p is negative, provided $(\frac{1}{3}p)^3$ is less than $(\frac{1}{2}q)^2$, or $4p^3$ less than $27q^2$; otherwise the roots are all real, namely, whenever p is negative, and $4p^3$ either equal to, or greater than $27q^2$.

Every cubic equation of the above form, viz. wanting the 2d term, has both positive and negative roots, and the greatest root is always equal to the sum of the two less roots; viz. either one positive root equal to the sum of the two negative ones, or else one negative root equal to the sum of two smaller and positive ones. And the sign of the greatest, or single root, is positive or negative, according as q is positive or negative when it stands on the right-hand side of the equation, thus $x^3+px=q$; and the two smaller roots have always the contrary sign to q.

Having reduced the cubic to its general form $x^3+px=q$; its roots may in most cases be found by the rule invented by Ferreus and Tartalea, and published by Cardan: which is this: Put $a=\frac{1}{3}p$, and $b=\frac{1}{2}q$, then is the first root

$x=\sqrt[3]{b+\sqrt{b^2+a^3}}+\sqrt[3]{b-\sqrt{b^2+a^3}}$; or if there be put $s=\sqrt[3]{b+\sqrt{b^2+a^3}}$, and $d=\sqrt[3]{b-\sqrt{b^2+a^3}}$; then $s+d=x$, the 1st root,

also $-\frac{s+d}{2}+\frac{s-d}{2}\sqrt{-3}$ is the 2d root,

and $-\frac{s+d}{2}-\frac{s-d}{2}\sqrt{-3}$ is the 3d root.

Now, the first of these is always a real root, though it is not always the greatest root, as it has been commonly mistaken for. This rule always exhibits the root in the form of an imaginary quantity when the equation has no imaginary roots at all; but in the form of a real quantity when the equation has two imaginary roots. As to the other two roots, viz.

$-\frac{s+d}{2}\pm\frac{s-d}{2}\sqrt{-3}$, though, in their general form, they have an imaginary appearance; yet, by substituting certain particular numbers, they come out in a real form in all such cases as they ought to be so.

But, after the first root is found by this rule, the other two roots may be exhibited in several other different ways; some of which are as follow:

Let r denote the 1st root,
and v and w the other two roots:
then is $v+w=-r$, and $vwr=q$;
and the resolution of these two equations will give the other two roots v and w.

Or resolve the quadratic equation $x^2+rx+r^2+p=0$, and its two roots will be those sought.
Or the same two roots will be

either $-\frac{1}{2}r+\frac{1}{2}\sqrt{r^2-\frac{4q}{r}}$ and $-\frac{1}{2}r-\frac{1}{2}\sqrt{r^2-\frac{4q}{r}}$, or $-\frac{1}{2}r+\frac{1}{2}r\sqrt{1-\frac{4q}{q-pr}}$ and $-\frac{1}{2}r-\frac{1}{2}r\sqrt{1-\frac{4q}{q-pr}}$.

Ex. 1. If the equation be $x^3-15x=4$: here $p=-15$, $q=4$, $a=-5$, $b=2$; hence $\sqrt{b^2+a^3}=\sqrt{4-125}=\sqrt{-121}=11\sqrt{-1}$, $s=\sqrt[3]{2+\sqrt{-121}}=2+\sqrt{-1}$, and $d=\sqrt[3]{2-\sqrt{-121}}=2-\sqrt{-1}$: therefore $r=c+d=4$, the 1st root; and $-\frac{s+d}{2}\pm\frac{s-d}{2}\sqrt{-3}=-2\mp\sqrt{3}$, the other two roots.

Ex. 2. If $x^3+18x=6$: here $a=6$, and $b=3$; then $\sqrt{b^2+a^3}=\sqrt{9+216}=\sqrt{225}=15, s=\sqrt[3]{3+15}=\sqrt[3]{18}$, and $d=\sqrt[3]{3-15}=\sqrt[3]{-12}=-\sqrt[3]{12}$: therefore $r=s+d=\sqrt[3]{18}-\sqrt[3]{12}=\cdot 331313$, the 1st root, and $-\frac{\sqrt[3]{18}-\sqrt[3]{12}}{2}\pm\frac{\sqrt[3]{18}+\sqrt[3]{12}}{2}\sqrt{-3}$ are the two other roots.

Mr. Ivory, now of the Royal Military College, Great Marlow, gave a paper on cubic equations, in Part I. of the Edinburgh Philosophical Transactions, for 1799. The following is a sketch of his method.

Let $x^3+Ax^2+Bx+C=0$, be any proposed cubic equation.

I. Compute $M=3+2A+B$.
$N=A+2B+3C$.
$m=BN-3CM$.
$n=3N-AM$.

And $Q=(4B^3+27C^2)-2AC(9B-A^2)+A^2(2AC-B^2)$.

And let it be carefully noted under which of the two following cases the equation comes.

Case I. When Q is negative.

Case II. When Q is positive.

To these may be added, Case III. When $Q=0$.

II. Compute also $a=\frac{\pm m}{\sqrt{\mp 3Q}}$

$$b=\frac{\pm n}{\sqrt{\mp 3Q}}=\frac{an}{m}$$

and $\tau=-\frac{Ma+Nb}{M+N}$.

Then if the equation comes under case I: find the angle ϕ of which the tangent τ, the radius being unity:

Take $Z=\tan.\frac{\phi}{3}$, $Z=\tan.\left(\frac{\phi}{3}+120\right)$ and $Z=\tan.\left(\frac{\phi}{3}+240\right)$, and the three roots of the equation will be found by substituting these values of z in the formula $x=\frac{a+z}{b+z}$. But if one of the values of z be found, the other two may be also found; thus, let v be one value of z, then the other two are $\frac{v+\sqrt{3}}{1-v\sqrt{3}}$ and $\frac{v-\sqrt{3}}{1+v\sqrt{3}}$.

If the given equation comes under Case II.

$$\text{Compute } Z=\frac{1-\sqrt[3]{\frac{1-\tau}{1+\tau}}}{1+\sqrt[3]{\frac{1-\tau}{1+\tau}}}$$

and the only root of the equation will be found by substituting this value of z in the formula $x=\frac{a+z}{b+z}$.

In the third case, viz. when $Q=0$, then two of the roots of the equation are equal, and each $=\frac{m}{n}$, and the third root $=\frac{2Mm+N(3n-m)}{2Nn+M(3m-n)}$.

Besides the above there are various other methods of determining the roots of cubic equations, as by infinite series, by angular sections, and tables of sines, by the methods of approach, by trial and errour, &c. for which consult Dr. Hutton's Tracts, Landen's Memoirs, Euler's, Emersons, Maclaurin's, and Maseres's Algebra, Mauduitt's Trigonometry, &c. See also IRREDUCIBLE CASE, and CONTINUED SURDS.

CUBIC FOOT, or YARD, &c. of any thing, is so much of it as is contained in a cube whose side is a foot, or a yard, &c. respectively.

CUBIC HYPERBOLA, is a figure expressed by the equation $xy^2=a$, having two asymptotes, and consisting of two hyperbolas, lying in the adjoining angles of the asymptotes, and not in the opposite angles, like the Apollonian hyperbola; being otherwise called by Newton, in his Enumeratio Linearum Tertii Ordinis, an hyperbolismus of a parabola; and is the 65th species of those lines according to him.

CUBIC PARABOLA, a curve of the second order, having two infinite legs, tending contrary ways. If the absciss x touch the curve in a certain point c, the relation between the absciss and ordinate is expressed by the equation $y=ax^3+bx^2+cx+d$: or, in the simplest case, the equation is $y=ax^3$.

CU'BICALNESS. *s.* (from *cubical.*) The state or quality of being cubical.

CU'BICULARY. *a.* (*cubiculum*, Lat.) Fitted for the posture of lying (*Brown*).

CU'BIFORM. *a*, (from *cube* and *form.*) Of the shape of a cube.

CUBIT, among the ancients, a long measure equal to the length of a man's arm, from the elbow to the tip of the fingers. Dr. Arbuthnot makes the English cubit equal to eighteen inches; the Roman cubit equal to 1 foot, 5·406 inches; and the cubit of the Scripture equal to 1 foot, 9·888 inches.

CUBIT. (*cubitus*, from *cubo*, to lie down; because the ancients used to lie down on that part at their meals.) In anatomy, the forearm, or that part between the bend of the arm, including the elbow and wrist.

CUBITÆUS, in anatomy, the name of two muscles, the one called cubitæus externus, being the first of the extensor muscles of the fingers, arises from the external extuberance of the humerus, and passing its tendon under the ligamentum annulare, is inserted into the fourth bone of the metacarpus that sustains the little finger; the other is the cubitæus internus, which ariseth from the internal extuberance of the humerus, and upper part of the ulna, upon which it runs all along, till it passes under the ligamentum annulare, and is inserted, by a strong and short tendon, into the fourth of the first order of the carpus.

CU'BITAL. *a.* (*cubitalis*, Lat.) Containing only the length of a cubit (*Brown*).

CUBITAL ARTERY. (*arteria cubitalis, vel ulnaris.*) A branch of the brachial that proceeds in the fore-arm, and gives off the recurrent and interosseals, and forms the palmary arch, from which arise branches going to the fingers, called digitals.

CUBITAL NERVE. (*nervus cubitalis, vel ulnaris.*) Ulnar nerve. It arises from the brachial plexus, and proceeds along the ulna.

CUBO-CUBO-CUBUS, or CUBUS-CUBI, the Arabian name for the ninth power.

CUBO-CUBUS, a name for the sixth power

CUBOIDES OS. (*cuboides*, κυβοειδης; from κυβος, a cube or die, and ειδος, likeness). A tarsal bone of the foot, so called from its resemblance.

CUCKFIELD, a town in Sussex, with a market on Fridays. Lat 51. 8 N. Lon. 0. 9 W.

CUCKING-STOOL, an engine invented for punishing scolds and unquiet women, by ducking them in water; called in ancient times a tumbrel, and sometimes a trebucket. Some think it a corruption from ducking-stool; others from choking-stool, *quia hoc modo demersæ aquis fere suffocantur.*

CU'CKOLD. *s.* (*cocu*, French.) One that is married to an adultress; one whose wife is false to his bed (*Shakspeare*).

To CU'CKOLD. *v. a.* 1. To rob a man of his wife's fidelity (*Shakspeare*). 2. To wrong a husband by unchastity (*Dryden*).

CU'CKOLDY. *a.* (from *cuckold.*) Having the qualities of a cuckold; poor; mean (*Shakspeare*).

CU'CKOLDMAKER. *s.* (*cuckold* and *make.*) One that makes a practice of corrupting wives (*Dryden*).

CU'CKOLDOM. *s.* (from *cuckold.*) 1. The act of adultery (*Dryden*). 2. The state of a cuckold (*Arbuthnot*).

CU'CKOO. *s.* (*cwccw*, Welch.) CUCKOW. In ornithology. See CUCULIS.

CUCKOW FLOWER. See CARDAMINE.

CUCKOW PINT. See ARUM.

CUCUBALUS. Berry-bearing chickweed. A genus of the class decandria, order trigynia. Calyx one-leaved, inflated; petals five with claws; berry superior, one celled, many seeded. One species only; a native of our own hedges. There are various other plants classed by some botanists under this genus, but erroneously; the c. baccifer being the only species which at present is known to correspond essentially with its characters.

CUCUJUS. In zoology, a genus of the class insectæ, order coleoptera. Antennas filiform; feelers four, equal, the last joint truncate, and thicker; lip short, bifid, the divisions linear and distant: body depressed. Thirteen species; found chiefly in Germany, though occasionally in other parts of Europe, and one or two species in Africa and South America. C. testaceus is usually traced on the birch tree under its bark; the thorax is nearly square, unarmed, body testaceous, thighs compressed.

CUCULLANUS. In zoology, a genus of the class vermes, order intestina. Body sharp, pointed behind, and obtuse before; mouth orbicular, with a striate hood: most of these are viviparous, and generally intestinal. Eight species; three mammallary, of which two, viz. c. talpæ and c. ochreatus, are found in the body or intestines of the mole; and one, c. muris, in the intestines of the mouse; one avian, found in the intestines of the buzzard; one amphibial, inhabiting the intestines of the hog; and three piscatory. C. lacustris, found in the intestines and liver of the eel, perch, ruffe, salmon, trout, and some other fishes; c. ascaroides, found in the stomach of the silurius glanus, gregarious, about an inch long, greyish white, and resembling the maggots of a fly; and c. murinus, yellowish ash, obtuse on the fore-part, found in one variety with cirri, and in another without, in the intestines of the cod-fish; and produced oviparously.

CUCULLARIA. In botany, a genus of the class monandria, order monogynia. Calyx four-parted; coral four-petalled, unequal, spurred; filaments petal-like; anthers with distinct cells. One species only; a tall tree of Guiana, with pale yellow flowers.

CUCULLARIS MUSCLE. (*cucullaris musculus*; from *cucullus*, a hood: so named, because it is shaped like a hood). See TRAPEZIUS.

CU'CULLATE. CU'CULLATED. *a.* (*cucullatus*, hooded, Latin.) 1. Hooded; covered, as with a hood or cowl. 2. Having the resemblance or shape of a hood (*Brown*).

CUCULUS. Cuckow. In zoology, a genus of the class aves, order picæ. Bill smooth, a little curved; nostrils surrounded by a small rim; tongue arrowed, short, pointed; feet scansorial. Fifty-five species; scattered over the globe. See Nat. Hist. Pl. LIV.

The following are most worthy of notice:

1. C. canorus; common cuckow. Cinereous; beneath whitish; transversely streaked with brown: tail rounded, blackish, dotted with white: edges of the eye-lids, opening of the mouth, and palate saffron; when young the whole body brownish, the feathers edged with white. Two other varieties, one with the body varied with reddish; the other grey-waved, with a few white dots; bill, orbits and legs suphur. Inhabits Europe, Asia and Africa: fourteen inches long; feeds on insects and the larvas of moths; migrates; is heard about the middle of April, and ceases to sing at the end of July: is incapable of hatching its own eggs, and deposits them in the nest of some other bird, generally the hedge-sparrow; leaving the care of its young to foster parents. The eggs are reddish-white, thickly spotted with blackish-brown. The reason why the cuckow does not build herself a nest and perform the office of incubation has not hitherto been assigned: many conjectures have been offered, but nothing that is satisfactory. The cuckow song which is so familiar to us from the woods, and which has almost universally given the same name to the bird, is the note of the male alone. The song of the female is very different and much less known; it has some resemblance to the cry of the dabchick. In some genera of birds we find more females than males; in the cuckow we find fewer. Mr. Pennant endeavours to account for this circumstance from a belief that the male birds are more liable to be shot than the female, being more readily betrayed to the gunner by his note. But this can scarcely be admitted as the real cause, for every female seems generally and instinctively attended by two or three males from the earliest period of their arrival in every country, which should seem to show that there is a greater

population of males than females from birth.

2. C. indicator. Honey-guide cuckow. Rusty-grey, beneath white; eye-lids naked, black; shoulders with a yellow spot; tail wedged, rusty. Bill brown at the base and surrounded with bristles, yellow at the tip; feathers of the thighs white, with a longitudinal black streak; quill-feathers above brown, beneath grey-brown; first tail feathers very narrow, rusty: the next sooty, the inner edge whitish, the rest brown at the tip on the inner web. Inhabits the interior parts of Africa: six inches long; is fond of honey, and, not being able to procure it from the hollows of trees, is said by its note which resembles a call of *chern, chern*, to conduct the inhabitants of the country, and especially the professed honey-hunters, as well as a wild quadruped, which is probably a species of badger, to the wild-hives and point them out, by which either by accident or design it becomes rewarded for its trouble by obtaining some quantity of the spoil. It is hence highly esteemed by the Hottentots, who deem it criminal to injure or destroy the bird.

3. C. honoratus. Sacred-cuckow. Tail wedged; body blackish, spotted with white; beneath barred with spotted and cinereous. Inhabits Malabar; eleven and a half inches long; feeds on reptiles that are injurious to vegetation, and on this account preserved with great care and venerated by the natives.

4. C. vetula. Long-billed, rain cuckow. Tail wedged; body brownish; beneath testaceous; eye-lids red: bill long, upper mandible black, lower whitish; crown brown; eye-brows with scarlet dots; chin and throat whitish; two middle-tail feathers olive ash, the rest black tipt with white; legs blueish-black. Inhabits woods and shrubs in Jamaica: is easily tamed and sings before rain; flies short, and feeds on insects, worms, seeds, small serpents, frogs, lizards, and small birds; fifteen inches long.

CUCUMBER. In botany. See CUCUMIS.

CUCUMBER (Ass's). See MOMORDICA.

CUCUMBER (Egyptian). See MOMORDICA.

CUCUMBER (Serpent). See TRICHOSANTHES.

CUCUMBER (Single-seeded.) See SICYOS.

CUCUMBER (Small creeping.) See MELOTHRIA.

CUCUMBER (Spirting). See MOMORDICA.

CUCUMBER (Wild). See MOMORDICA.

CUCUMIS. Cucumber. A genus of the class monoecia, order triandria. Male; calyx five-leaved; corol five-parted; filaments three; anthers cohering. Fem.: calyx five-toothed; corol five parted; pistil three-cleft; some succulent; seeds ovate, acute, compressed. Thirteen species; chiefly natives of India and the Levant. Of these the following are the principal.

1. C. colocynthis; with leaves in many divisions; fruit globular, smooth; stems rough, a native of Barbary, and termed vernacularly coloquintido, bitter-gourd, or bitter-apple. The flowers are white, and succeeded by a fruit of the size of a large apple, of a yellow hue when ripe. The pulp is used chiefly; and forms an article of the materia medica; for the medicinal virtues of which, see COLOCYNTHIS.

2. C. chate. Hairy-cucumber; a native of Egypt and the Levant. Angles of the leaves entire, rounded; fruit spindle shaped, tapering to each end, rough with hairs. It has something of the make and taste of the melon, but neither so cool, nor so fragrant; yet it is esteemed a considerable luxury.

3. C. melo. Melon. A native of Persia; angles of the leaves rounded; fruit swelling with carbuncles or other protuberances. The chief varieties of the melon are:

α. Canteloupe.
β. Roman.
γ. Portugal.

In general these are raised too early among ourselves, and consequently acquire an insipid and inconcocted maturity from having been too little exposed to the full strength of the summer sun.

4. C. sativus. Common-cucumber; angles of the leaves straight; fruit oblong, and rough. The chief varieties are:

α. Common green, rough, prickly cucumber.
β. Short, green, prickly cucumber.
γ. Long, green, prickly cucumber.
δ. Early, green, cluster cucumber.
ε. Long, smooth, green, Turkey cucumber.
ζ. Long, smooth, white, Turkey cucumber.
η. Long, smooth, green, Roman cucumber.
θ. Long, white, prickly Dutch cucumber.

The cultivation of all these is not essentially different. The first variety is more generally resorted to than any of the others; and it is raised at three different seasons of the year; first in hot-beds under frames for early fruit; next under glass bells, or hand glasses for a middle crop; and lastly in the common ground and atmosphere for pickling.

The hot-bed should be made in the beginning of January of fresh horse-dung; which becoming hot in four or five days, should be covered with good fine earth about two inches thick, over which the frame or hand-glass should be placed; the seeds being sown about two days after, or as soon as the earth has become warm. The seeds should be covered with a quarter of an inch of fresh earth, and the glass set over them as before. The glass must be covered with a mat at nights, and in four days the young plants will appear; when these are seen, the rest of the dung must be made up into a bed for one or more lights. This must be three feet thick, and beat close together, and covered three inches deep with fine fresh earth; the frame must then be put on, and covered at night, or in bad weather, with mats. When the earth is hot enough, the plants from under the bell must be transplanted into it, and set at two inches distance. The glasses must be now and then a little raised to give air to the plants, and turned often, to prevent the wet from the

steam of the dung from dropping down upon them. The plants must be watered at times with water, set on dung till as warm as the air in the frame; and as the young plants grow up, their stalks should be earthed up, which will give them great additional strength. If the bed be not hot enough, some fresh litter should be laid round its sides; and if too hot, some holes should be bored into several parts of it with a stake, which will let out the heat, and when the bed is thus brought to a proper coolness, the holes are to be stopped up again with fresh dung. When these plants begin to shoot their third, or rough leaf, another bed must be prepared for them like the first, and when it is properly warm through the earth, the plants of the other bed must be taken up, and planted in this, in which there must be a hole in the middle of each light, of about a foot deep, and nine inches over, filled with light and fine fresh earth, laid hollow, in form of a bason: in each of these holes there must be set four plants; these must be, for two or three days, shaded from the sun, that they may take firm root, after which they must have all the sun they can, and now and then a little fresh air, as the weather will permit. When the plants are four or five inches high, their stalks should be gently pegged down toward the earth, in as different directions as may be from one another, and the branches afterwards produced, should be treated in the same manner. In a month after this, the flowers will appear, and soon after the rudiments of the fruit. The glasses must now be carefully covered at nights, and in the daytime the plants should have gentle waterings. These will produce fruit till about midsummer, at which time those of the second crop will come in to supply their place: these are to be raised in the same manner as the early crop, only they do not require quite so much care and trouble. This second crop should be sowed in the end of March, or beginning of April.

The season for sowing the cucumbers for the last crop, and for pickling, is toward the latter end of May, when the weather is settled: these are sown in holes dug to a little depth, and filled up with fine earth, in form of a bason, eight or nine seeds in each hole. These will come up in five or six days, and, till they are about a week old, are in great danger from the sparrows; after this they require only watering now and then, and keeping clear from weeds. There should be only five plants left at first in each hole, and when they are grown a little farther up, the worst of these is to be pulled up, that there may finally remain only four. The plants of this crop will begin to produce fruit in July.

The proper management and culture of melons is as follows: The seeds should be procured from good melons produced in some distant garden; for if sowed on the place where it was raised and ripened, it is very apt to degenerate. This seed should be kept three years before it is sowed, and it should be sowed at two seasons. The first for the early crop, to be raised under frames, should be sown in January, or the beginning of February: the second, to be raised under bell or hand-glasses, is to be sown in March, and this is the sowing which produces the general crop of melons, which ripen in July and August. About a week before the time of sowing the seed, some dung should be prepared in a heap with the litter, or some coal-ashes, and the same methods used as in the early cucumbers for the first crop; but for the second, which is of more general use, the sowing may be on the upper sides of the hot-beds that were for the early melons or cucumbers, or on a fresh moderate hot-bed. When the young plants are come up, they must be removed to another hot-bed, and covered with hand-glasses, and watered and shaded till they have taken root; and after this they must have as much air and sun as the season will permit, and their stalks should be earthed up as they grow, which will vastly strengthen them. In the beginning of April the plants will begin to shew their rough leaves, and a parcel of dung is then to be prepared with the litter and coal-ashes. The common quantity is a load to five holes; a trench must then be dug, which should be ten inches deep, if the soil be dry, but only three if it be wet. The dung must be evenly laid in this, and heaped up to three feet high. Then the places intended for the holes must be marked out, at each of which must be laid a basket full of light rich earth, thrusting a stick of two feet long into the middle. Next cover the dung all over with the earth which was dug up out of the trench, laying it smooth, and about three inches thick; then the glasses are to be placed close down over the place where each of the sticks is, and in two days the earth will be warm enough to receive the seedling plants. The sticks are now to be taken out, and the earth formed in the places into a hollow like a bason, that it may retain the water which is given to the plants. The plants are then to be taken up, and two strong and thriving ones put into each of these holes, which must be watered and shaded till they have taken root. The plants having taken root, and thrust out a fourth leaf, the top of each of them should be pulled off, in order to force out shoots from the bottom, and as the weather becomes warmer, the glasses must be raised with stones on the south side, to give them air; and about twice a week they should have a little water. About the middle of May the stalks of the plants will begin to press upon the glasses on every side, and the glasses are then to be raised up on bricks, to give them room to run out; and they should be pegged down with forked sticks, and turned into a proper direction for their running, so that they may be out of the way of tangling one with another: they should now, if the weather be severe, be sheltered with mats in the night, and watered gently at times. When the stalks of the plants are grown to the edges of the bed, the earth must be raised with old dung buried under it, till it be upon a level with the beds, for two feet wide on each side. The

branches are here to be trained in a proper course, and the glasses are to be left over the roots of the plants; and after this, what water is given them is to be sprinkled all over the plants. When the fruit begins to appear, the waterings must be very gentle on the plants; but it will be proper to soak the earth well with large quantities of water about the beds, which will spread a moisture even to the roots of the plants; from this time the plants should be gently watered twice a week, and that always in the evening. When the melons are grown of the size of a tennis ball, a piece of tile should be laid under each to keep them from the ground. As they afterwards approach to ripeness, they should be turned several times, that they may ripen equally on every side; and if the weather be not very favourable, they should be covered with glasses. If the melon is designed to be eaten as soon as cut, it should be suffered to remain on the plant till it changes pretty yellow, and the stalk begins to separate from the fruit; but if it is to be kept two or three days after cutting, it must always be cut proportionably earlier. It is a practice with many to take off the leaves about the fruit, that it may have more sun; but this is wrong, and the fruit is always the worse tasted for it, and the skin is hard and tough.

CUCURBIT, in chemistry, an oblong glass vessel with a very wide mouth (nearly of the form of a long *gourd*, whence its name), used for various purposes in experiments belonging to this science, and constituting the body of the common glass alembic. See CHEMISTRY, Pl. 11.

CUCURBITA. Gourd. In botany, a genus of the class monoecia, order triandria. Male; calyx five-toothed; corol five-cleft; filaments three; anthers cohering. Fem.; calyx five-toothed; corol five-cleft; some from three to six celled; seeds with a tumid margin. Seven species; America, India, south of Europe.

1. C. lagenaria. Bottle-gourd, with a woody fruit, and tendrils trailing along the ground fifteen or sixteen feet in length. An American plant.

2 C. hispida; a native of Japan: flowers set with ferruginous hairs.

3 C ovifera; a native of Astracan, with obovate fruit marked with ten white longitudinal lines.

4. C. pepo. Pompion, or pumkin. A plant bearing much resemblance to the bottle-gourd, but considerably stronger, with thick trailing stalks, branching into numerous runners, extending from ten to forty or fifty feet each way, with a round instead of a long fruit, and sometimes as large as half a bushel measure. It is the most hardy of all the species; and if properly cultivated may be made to cover by a single plant twelve or fifteen roods of ground.

5. C. verrucosa. Warty-gourd. An American-plant, bearing a fruit with a rind almost woody.

6. C. melopepo; upright Squash: rising with an erect strong stalk several feet high, and bushy upwards; the fruit of moderate size, depressed and knotty. East Indies.

7. C. citrullus. Water-melon. A native of the south of Europe, with a fruit from a foot to a foot and a half in diameter, esteemed for its coolness in hot climates, but insipid in our own country.

CUCURBITACEÆ. In botany. (*cucurbita*, a gourd.) The forty-fifth order in Linnéus's fragments of a natural method; and the thirty-fourth of his natural orders.

CUCURBITULA. See CUPPING-GLASS.

CUD, that substance contained in the first stomach of a ruminating animal, which is disgorged, chewed again at leisure, and passed into the second stomach to be digested. Vague accounts have been given by ignorant farriers of a disease which they call lost cud, by which is merely meant a suspension of the process of rumination, when the animal is poor and out of health. An account of their prescriptions for restoring the lost cud in cows, oxen, sheep, &c. would be not merely useless, but disgusting.

CUDWEED. In botany. See GNAPHALIUM

CUDWEED (Bastard). See MICROPUS.

CUDDALORE, a town of Hindustan, on the coast of Coromandel, belonging to the English, very near the place where Fort St. David once stood. Lat. 11. 41 N. Lon. 79 45 E.

CU'DDEN. CU'DDY. *s.* A clown; a stupid rustick; a low dolt (*Dryden*).

To CU'DDLE. *v. n.* To lie close; to squat (*Prior*).

CU'DGEL. *s.* (*kudse*, Dutch.) 1. A stick to strike with (*Locke*). 2. *To cross the* CUDGELS, is to forbear the contest (*L'Estr.*)

To CU'DGEL. *v. a.* (from the noun.) To beat with a stick (*South*).

CUDGEL-PROOF. *a.* Able to resist a stick.

CU'DLE. *s.* A small sea fish (*Carew*).

CUDWORTH (Ralph), a learned divine. He was born at Aller in Somersetshire, in 1617, and educated at Emanuel college, Cambridge. About 1641 he obtained the rectory of North Cadbury, in the county of Somerset; and in 1642 appeared his Discourse on the Lord's Supper. Two years afterwards he was appointed master of Clare-hall, Cambridge, to which was added the Hebrew professorship. In 1651 he took the degree of D.D. and in 1654 he was made master of Christ's college, Cambridge. On the restoration of Charles II. he was presented to the vicarage of Ashwell in Hertfordshire; and in 1678 he obtained a prebend in the cathedral of Gloucester. The same year came out his famous book entitled, The true Intellectual System of the Universe, in which he has completely overthrown atheism. He died at Cambridge in 1688. In 1731 bishop Chandler published Dr. Cudworth's treatise concerning Eternal and Immutable Morality; and in 1743 appeared a complete edition of his Intellectual System, with some additional pieces, edited by Dr. Birch. (*Watkins*).

CUE. *s.* (*queue*, a tail, French.) 1. The tail

or end of any thing. The last word of a speech (*Shakspeare*). 3. A hint; an intimation; a short direction (*Swift*). 4. The part that any man is to play in his turn (*Rymer*). 5. Humour; temper of mind: a low word.

CUENCA, a jurisdiction of South America, in the country of Terra Firma, and audience of Quito, containing fourteen parishes, and a town of the same name.

CUENÇA, a town of South America, in Terra Firma, and capital of a jurisdiction to which it gives name, in the audience of Quito, containing between 24 and 30,000 inhabitants: 150 miles S. Quito.

CUENÇA, a town of Spain, in New Castile, anciently called Conca, the see of a bishop, suffragan of Toledo, situated between two lofty mountains and two small streams, which form the Xucar: it was taken by the earl of Peterborough in 1706; but soon after retaken by the duke of Berwick: seventy-five miles E. Madrid, and 100 W.N.W. Valencia. Lon. 14. 35 E. Lat 40. 10 N.

CUE'RPO. *s.* (Spanish.) To be in *cuerpo* is to be without the upper coat, so as to discover the shape of the *cuerpo* or body (*Hudib.*).

CUFF. *s.* (*zaffa*, a battle, Italian.) A blow with the fist; a box; a stroke (*Shakspeare*).

To CUFF. *v. n.* (from the noun.) To fight; to scuffle (*Dryden*).

To CUFF. *v. a.* 1. To strike with the fist (*Shakspeare*). 2. To strike with talons (*Otw.*).

CUFF. *s.* (*coëffe*, Fr.) Part of the sleeve (*Arbuthnot*).

CUIRASSE, a piece of defensive armour, made of plate, serving to cover the body, from the neck to the girdle, both before and behind.

CUIRASSIERS, cavalry armed with cuirasses, as most of the Germans are. The French have a regiment of cuirassiers: but we have had none in the English army since the Revolution.

CUISH. *s.* (*cuisse*, French.) The armour that covers the thighs (*Dryden*).

CUL DE FOUR, in architecture, a sort of low, oven-like vault.

CULDEES, or KULDEES, in church history, a designation given to the first monks or priests in Scotland, whence the term passed into Ireland.

CULEMBERG, a town of Dutch Guelderland, on the river Leck. Lat. 51. 58 N. Lon. 5. 12 E.

CULEUS, in antiquity, the name of the greatest of all the liquid measures among the Romans. The culeus at the vineyard contained about 140 gallons, 3½ pints, of our wine measure.

CULEUS is also used by some Roman authors for a leather sack.

CULEX. Gnat. In zoology, a genus of the class insectæ, order diptera. Mouth with a single-valved, exserted, flexile sheath inclosing five bristles; feelers two of three articulations; antennas approximate, filiform. These insects live by sucking out the blood and juices of the larger animals; and, in turn, are eagerly sought after by poultry and sparrows; the larva resides in stagnant waters; and has a small cylindrical, respiratory tube near the tail; the head is armed with hooks to seize on the aquatic insects upon which it feeds; the pupa is incurved and ovate with respirating tubes near the head. Fourteen species, scattered over the globe. The following are the most remarkable:

1. C. pipiens. Cinereous, with eight brown rings on the abdomen; antennas of the male pectinate or feathered. Inhabits Europe, and is every where known by its shrill, buzzing noise and severe puncture. It is said sometimes to shine by night. In the savannas of warmer climates a much larger species is found, known by the name of the musqueto fly, which inflicts so severe a wound that the inhabitants are obliged to sleep under thin gauze nets to protect themselves from its attack.

2. C. hæmorrhoidalis. Brown; abdomen edged with rufous fringe at the tip; head brown with a shining blue crown; thorax elevated with a blue fore margin and dot before the wings; legs blue, thighs testaceous beneath; wings white with a brown rib. Inhabits Cayenne; the largest of its family.

3. C. pulicaris. Brown; wings white with three dusky spots. Smaller than the common gnat: inhabits Europe.

4. C. reptans. Black with hyaline wings: legs black with a white ring. Inhabits Europe, and is particularly troublesome in marshy districts during the evening, by its creeping motion on the skin of the face or body. See Nat Hist. Pl. LV.

CULIACAN, a town of Mexico, capital of a province of the same name. Lat. 24. 0 N. Lon. 108. 5 W.

CU'LINARY. *a.* (*culina*, Latin.) Relating to the kitchen (*Newton*).

To CULL. *v. a.* (*cueillir*, Fr.) To select from others; to pick out of many (*Pope*).

CULLEN (William), an eminent chemist and physician. He was born in the county of Lanark in Scotland, and served his apprenticeship to a surgeon at Glasgow. When he was out of his time he went abroad as surgeon in a merchant-ship; but on his return to his own country he established himself in business, and had Dr. William Hunter for a partner. In 1740 he took his degree of M.D. and in 1746 he was chosen lecturer in chemistry at the university of Glasgow. In 1751 he was appointed king's professor of medicine in the same university. In 1756 he was elected professor of chemistry at Edinburgh, on which he resigned his places at Glasgow. On the death of Dr. Alston, professor of medicine, in 1763, Dr. Cullen was chosen to be his successor. His lectures became very popular, and have been since printed. When the infirmities of old age came on he resigned his situation to Dr. Black; but he afterwards gave lectures on the practice of physic, which he continued till nearly the time of his death, which happened in 1790.

Cullen was not less celebrated as a teacher of

chemistry than of medicine. His lectures were delivered *viva voce*, merely with the assistance of a few short notes to prevent his varying the general order. He considered the business of a preceptor to be that of putting his pupils into a proper train of study, so as to enable them to prosecute those studies at a future period, and to carry them on much farther than the short time allowed for academical prelections would admit. He did not, therefore, so much strive to make those who attended his lectures deeply versed in the particular details of objects, as to give them a general view of the whole subject; to shew what had been already attained respecting it; to point out what remained yet to be discovered; and to put them into a train of study that should enable them, at a future period, to remove those difficulties that had hitherto obstructed our progress; and thus to advance of themselves to farther and farther degrees of perfection. If these were his views, nothing could be more happily adapted to them than the mode he invariably pursued. He first drew, with the striking touches of a master, a rapid and general outline of the subject, by which the whole figure was seen at once to start boldly from the canvas, distinct in all its parts, and unmixed with any other object. He then began anew to retrace the picture, to touch up the lesser parts, and to finish the whole in as perfect a manner as the state of our knowledge at the time would permit. Where materials were wanting, the picture there continued to remain imperfect. The wants were thus rendered obvious; and the means of supplying these were pointed out with the most careful discrimination. The student, whenever he looked back to the subject, perceived the defects; and his hopes being awakened, he felt an irresistible impulse to explore that hitherto untrodden path which had been pointed out to him, and fill up the chasm which still remained. Thus were the active faculties of the mind most powerfully excited; and instead of labouring himself to supply deficiencies that far exceeded the power of any one man to accomplish, he set thousands at work to fulfil the task, and put them into a train of going on with it, when he himself should be gone to that country "from whose dread bourne no traveller returns." For his nosological system, see MEDICINE.

It was to these talents, and to this mode of applying them, that Dr. Cullen owed his celebrity as a professor; and it was in this manner that he has perhaps done more towards the advancement of science than any other man of his time, though many individuals might perhaps be found who were more deeply versed in the particular departments he taught than he himself was. Chemistry, which was before his time a most disgusting pursuit, was by him rendered a study so pleasing, so easy, and so attractive, that it is now prosecuted by numbers as an agreeable recreation, who but for the lights that were thrown upon it by Cullen and his pupils, would never have thought of engaging in it at all; though perhaps they never heard of Cullen's name, nor have at this time the most distant idea that they owe any obligations to him; and the same may be said of the other branches of science which he taught.

CULLEN, a royal borough on the coast of Banffshire, Scotland. Lat. 57. 40 N. Lon. 2. 40 W.

CU'LLER. *s.* (from *cull.*) One who picks or chooses.

CULLIAGE, a scandalous and immoral practice, whereby the lords of manors anciently assumed a right to the first night with the brides of their vassals.

CULLION, in botany. See ORCHIS.

CU'LLION. *s.* (*coglione*, a fool, Italian.) A scoundrel; a mean wretch (*Shakspeare*).

CU'LLIONLY. *a.* (from *cullion.*) Having the qualities of a cullion; mean; base (*Sh.*).

CULLODEN MUIR, a wide heath, in Scotland, three miles east of Inverness, on which the duke of Cumberland gained a decisive victory over the rebels, in 1746.

CU'LLY. *s.* (*coglione*, Italian, a fool.) A man deceived or imposed upon (*Arbuthnot*)

To CU'LLY. *v. a.* (from the noun.) To befool; to cheat; to impose upon.

CULM. See BITUMEN.

CULM. (*culmus.*) In botany, the stalk or stem of corn and grasses; usually jointed and hollow; supporting both the leaves and fructification. The word *straw* being commonly appropriated to the dry stalk of corn; the Latin *culm* seems to require introduction into the botanical vocabulary.

CULM, a town of Western Prussia, with a bishop's see, seated near the Vistula, 60 miles S. of Dantzic. Lon. 18. 30 E. Lat. 53. 24 N.

CULMIFEROUS PLANTS, in botany, such plants as have a smooth jointed stalk, usually hollow, and at each joint wrapped about with single, narrow, sharp-pointed leaves, and their seeds contained in chaffy husks, as wheat, barley, &c.

To CU'LMINATE. *v. n.* (*culmen*, Latin.) To be vertical; to be on the meridian.

CULMINATING POINT, that point of any given circle of the sphere which is on the meridian.

CULMINATION. *s.* In astronomy, the passage of any heavenly body over the meridian; or its greatest altitude during that diurnal revolution. For directions to find the time of culmination of the stars. &c. see White's Ephemeris, p. 45. or more fully in O. Gregory's Astronomy, chap. vi.

CULMINIÆ. (*culmen*, the top). In botany, the twenty-sixth order in Linnéus's Fragments of a natural method.

CULMORE, a town of Ireland, in the county of Londonderry, seated on the coast of Lough Foyle. Lat. 55. 8 N. Lon. 7. 3 W.

CULPABI'LITY. *s.* (from *culpable.*) Blamableness.

CU'LPABLE. *a.* (*culpabilis*, Latin.) 1. Criminal (*Shakspeare*). 2. Guilty (*Spenser*). 3. Blamable; blameworthy (*Hooker*).

CU'LPABLENESS. *s.* (from *culpable.*) Blame; guilt.

CU'LPABLY. *ad.* (from *culpable.*) Blamably; criminally (*Taylor*).

CU'LPRIT. *s.* A man arraigned before his judge (*Prior*).

Culprit, in law, a term used by the clerk of the arraignments, when a person is indicted for a criminal matter. After the indictment is read in court (which is the crown's charge against the prisoner at the bar), he is asked if guilty, or not guilty? If he answers, *not guilty*, there is next a replication from the crown, by continuing the charge of guilt upon him; which is expressed by pronouncing the word *cul-prit*; *cul* being an abbreviation of the Latin word *culpa*, guilt, or *culpabilis*, guilty, and *prit* (now *pret*) the old French word for *ready*; or, as others rather think, the Latin *apparet*, appears. From this formula, therefore, of the clerk of the arraignments, the prisoner is deemed guilty of the crime charged on him; and that the crown is ready to prove it upon him.

CULROSS, a royal borough of Scotland, on the frith of Forth, in a tract of country between Clackmannanshire and Kinrossshire, which is reckoned an appendage of the county of Perth. It is remarkable for an ancient palace or abbey, said to have been built by Canmorn. Lon. 3. 34 W. Lat. 56. 4 N

CU'LTER. *s.* (*culter*, Latin.) The iron of the plough perpendicular to the share (*Sh.*).

To CU'LTIVATE. *v. a.* (*cultiver*, Fr.) 1. To forward of improve the product of the earth, by manual industry (*Felton*). 2. To improve; to meliorate (*Waller*).

CULTIVA'TION. *s.* (from *cultivate.*) 1. The art or practice of improving soils, and forwarding or meliorating vegetables. 2. Improvement in general; melioration (*Dryden*).

CULTIVA'TOR. *s.* (from *cultivate.*) One who improves, promotes, or meliorates (*Boy.*).

Cultivator, is also a name given to an implement, somewhat of the horse-hoe kind, invented for the more convenient and effectual stirring of the earth or mould. See Husbandry.

CULTRATE, in natural history, shaped like a pruning knife.

CU'LTURE. *s.* (*cultura*, Latin.) 1. The act of cultivation (*Woodward*). 2. Art of improvement and melioration (*Tatler*).

To Cu'lture. *v. a.* (from the noun.) To cultivate; to till (*Thomson*).

CU'LVER. *s.* (culꞅne, Saxon.) A pigeon (*Spenser*).

CULVERIN, a long slender piece of ordnance or artillery, serving to carry a ball to a great distance. Manege derives the word from the Latin *colubrina*; others from *coluber*, snake; either on account of the length and slenderness of the piece, or of the ravages it makes. There are three kinds of culverins, viz. the extraordinary, the ordinary, and the least sized. 1. The culverin extraordinary has 5½ inches bore; its length 32 calibers, or 13 feet; weighs 4800 pounds; its load above 12 pounds; carries a shot 5¼ inches diameter, weighing 20 pounds weight. 2. The ordinary culverin is 12 feet long; carries a ball of 17 pounds 5 ounces; caliber 5½ inches; its weight 4500 pounds. 3. The culverin of the least size, has its diameter 5 inches; is 12 feet long; weighing about 4000 pounds; carries a shot 3¾ inches diameter, weighing 14 pounds 9 ounces.

CULVERT, an arched drain for the passage of water.

CULVERTAILED, among shipwrights, signifies the fastening, or letting, of one timber into another, so that they cannot slip out, as the carlings into the beams of a ship.

CUMÆ, in ancient geography, Cuma, an ancient city of Italy, in the Campania, west of Naples, and north of Baiæ, situated near the sea on a lofty rock. It is said to have been founded in very remote times by two colonies of Greeks. In Lucan's time, about A.D. 62, Cumæ appears to have been a populous city, from the following passage:

> " ——— Acidalia quæ condidit Alite merios
> Euboicam referens fœcunda Neapolis urbem."
>
> "Where the fam'd walls of fruitful Naples lie
> That may for multitudes with Cumæ vie."

To CU'MBER. *v. a.* (*komberen*, to disturb, Dutch.) 1. To embarrass; to entangle; to obstruct. 2. To crowd or load with something useless. 3. To involve in difficulties and dangers; to distress (*Shakspeare*). 4. To busy; to distract with multiplicity of cares (*Luke*). 5. To be troublesome in any place (*Grew*).

Cu'mber. *s.* (*komber*, Dutch.) Vexation; embarrassment; obstruction (*Raleigh*).

CUMBERLAND (Richard), an English prelate. He was born at London in 1632, and educated at Magdalen college, Cambridge, where he took his degrees in arts, and then entered into orders. In 1658 he obtained a living in Northamptonshire, and in 1667 he was presented to the living of All-hallows, Stamford. In 1672 he published a book in Latin, entitled, De Legibus Naturæ Disquisitio Philosophica, &c. which has been translated into English by two different persons. This work gained him a great reputation. In 1680 he proceeded D.D. In 1686 appeared his Essay on Jewish Weights and Measures. In 1691 he was made bishop of Peterborough without ever having solicited any preferment. He discharged the duties of the episcopal function in the most exemplary manner; and when he was desired to relax a little from his labours on account of his infirmities, he made this reply; " it is better to *wear* out than to *rust* out." He died in 1718, and lies buried in the cathedral of Peterborough. After his death were published two books by him, one entitled, Sanchoniathon's Phœnician History, translated from the first book of Eusebius de Preparatione Evangelica, &c. and the other, Origines gentium antiquissimæ, or Attempts for discovering the Times of the first Planting of Nations. (*Watkins*).

Cumberland (William duke of), the second son of George II. was born in 1721. He

was with his father at the battle of Dettingen, where he was wounded in the leg. When quite young, some officers, as he passed, said, "What a charming boy!" The young hero, thinking they said a *German* boy, went up to them and exclaimed, "I am not a *German* but an *English* boy; and I desire, gentlemen, that you will never call me so any more." He commanded the British army at the battle of Fontenoy, where he would have gained a victory if the Dutch troops had behaved as they ought to have done. He put an end to the rebellion in 1746, by defeating the Pretender at Culloden, for which he received the thanks of both houses. The year following he lost the battle of Val, owing to the treachery of the Dutch. He died in 1765. (*Watkins.*)

CUMBERLAND, a county of England, bounded on the N. by Scotland; on the E. by Northumberland, Durham, and Westmorland; on the S. by Lancashire; and on the W. by the Irish sea and Solway Frith. It is 70 miles in length from S.W. to N.E. and 50 in breadth from E. to W. where it is broadest. It contains one city, 14 market-towns, and 90 parishes. It lies in the dioceses of Chester and Carlisle, and sends six members to parliament; two for the county, two for Carlisle, and two for Cockermouth. The air is cold and piercing, yet less than might be expected from its being situated so far north. The mountains feed large flocks of sheep, whose flesh is particularly sweet and good, and the valleys produce corn, &c. There are mines of coal, lead, copper, lapis calaminaris, and black lead; the latter of which is almost peculiar to this county, which contains more than is sufficient to supply all Europe. This county contains about 970,240 acres of land, 462,000 acres of which are uncultivated, including woodlands. Its houses amount to 22,445, and its inhabitants to about 117,230. It furnishes 615 men to the national militia. This county has several lakes much celebrated, as Derwent-water, Buttermere-water, Broadwater, Ennerdale-water, &c. The Skiddaw is the principal mountain, and the chief rivers are the Eden and the Derwent.

CUMBERLAND, a county of Pennsylvania, 37 miles long, and 28 broad. In 1790 it contained 18,243 inhabitants. Carlisle is the capital.

CU'MBERSOME. *a.* (from *cumber.*) 1. Troublesome; vexatious (*Sidney*). 2. Burdensome; embarrassing (*Arbuthnot*). 3. Unwieldy; unmanageable (*Newton*).

CU'MBERSOMELY. *ad.* (from *cumbersome.*) In a troublesome manner.

CU'MBERSOMENESS. *s.* (from *cumbersome.*) Encumbrance; hinderance; obstruction.

CU'MBRANCE. *s.* (from *cumber.*) Burden; hinderance; impediment (*Milton*).

CU'MBROUS. *a.* (from *cumber.*) 1. Troublesome; vexatious; disturbing (*Spen.*). 2. Oppressive; burdensome (*Swift*). 3. Jumbled; obstructing each other (*Milton*).

CUMIN. In botany. See CUMINUM.

CUMIN (Bastard, or wild). See LAGŒCIA.

CUMINUM. Cumin. In botany, a genus of the class pentandria, order digynia. Involucres four-cleft; umbellets four; fruit ovate, striate. One species only; a native of Egypt, with slender, striped, panicled stem; linear, pointed leaflets. Its seeds are used medicinally, and have a bitterish taste, accompanied with an aromatic flavour, but not agreeable. They are, generally, preferred to other seeds for external use in discussing indolent tumours, as the encysted, scrophulous, &c. and give name both to a plaster and cataplasm in the pharmacopœias.

To CU'MULATE. *v. a.* (*cumulo*, Lat.) To heap together (*Woodward*).

CUMULA'TION. *s.* The act of heaping together.

CUNCTA'TION. *s.* (*cunctatio*, Lat.) Delay; procrastination; dilatoriness (*Hayward*).

CUNCTA'TOR. *s.* (Latin.) One given to delay; a lingerer: not in use (*Hammond*).

To CUND. *v. n.* (from *konnen*, to know, Dutch.) To give notice (*Carew*).

CUNÆUS (Peter), professor of law in the university of Leyden; born in 1586, and died in 1638. He wrote, 1. De Republica Hebræorum. 2. Satyra Menippœa in sui Seculi homines inepte eruditos. 3. Remarks on Nonius's Dionysiaca.

CU'NEAL. *a.* (*cuneus*, Latin.) Relating to a wedge; having the form of a wedge.

CU'NEATED. *a.* (*cuneus*, Latin.) Made in form of a wedge.

CU'NEIFORM. *a.* (from *cuneus* and *forma*, Lat.) Having the form of a wedge.

CUNEIFORM. (*cuneiformis*, as above.) In anatomy, several bones are so called, being shaped, or fixed in, like a wedge: such are the sphænoid bone, and some bones of the wrist and tarsus.

CUNEUS. See WEDGE.

CUNICULUS, in zoology. See LEPUS CUNICULUS.

CUNILA. In botany, a genus of the class diandria, order monogynia. Corol ringent, the upper lip erect, flat; two filaments barren; seeds four. Five species, scattered over the globe: one of which, c. fruticosa, of New Holland, resembles rosmarinus.

CU'NNER. *s.* A kind of fish less than an oyster, that sticks close to the rocks (*Ainsw.*).

CU'NNING. *a.* (from connan, Saxon.) 1. Skilful; knowing; learned (*Prior*). 2. Performed with skill; artful (*Spenser*). 3. Artful; deceitful; sly; trickish; subtile; crafty; subdolous (*South*). 4. Acted with subtilty (*Sidney*).

CU'NNING. *s.* (cunninȝe, Saxon.) 1. Artifice; deceit; sliness; sleight; craft; fraudulent dexterity (*Bacon*). 2. Art; skill; knowledge (*Psalms*).

CUNNINGHAM (John), an ingenious poet, was born in Dublin in 1729. His father was originally a wine-cooper, but obtaining a prize in the lottery, he became a wine merchant: being ignorant of the nature of this business, he soon failed, and his son John, who

was then at the grammar school at Drogheda, was obliged to return to Dublin. He then directed his views to the drama, and at the age of 17, produced a farce entitled, Love in a Mist, from which he derived some profits. After this he engaged with the manager of an itinerant company of comedians, with whom he visited England and Scotland. He passed two or three seasons at the theatre in Edinburgh. From Edinburgh he removed to Newcastle upon Tyne, where he assisted Mr. Slack, a printer, in establishing a newspaper. Repeated promises of patronage and assistance at length drew him to London; but before his journey turned to any good account, his wandering inclinations again induced him to join the itinerant company in the north. He died at Newcastle in 1773, after a long illness, during which he experienced much kind attention from Mr. Slack. Mr. Cunningham's poetical pieces are chiefly of the shorter kind, as fables, prologues, odes, songs, &c. The pastoral seems to have been his favourite theme, in which his compositions place him in no mean rank. Our author enjoyed the esteem of Shenstone; a circumstance not to be wondered at, as their poetic habits, as well as the cast of their minds, were in many respects similar. Cunningham lived some years after Shenstone, and celebrated the death of his friend in the beautiful song—"Come, shepherds, we'll follow the hearse."

CUNNINGHAM, the most northerly division of Ayrshire.

CUNNINGHAMIA. In botany, a genus of the class tetrandria, order monogynia; calyx four-toothed; corol funnel-form, four-cleft; drupe inferior, with a two-celled nut; style two-cleft. Two species; natives of Guinea and Mauritius.

CU'NNINGLY. *ad.* (from *cunning.*) Artfully; slily; subtly; crafty (*Swift*).

CU'NNINGMAN. *s.* (*cunning* and *man.*) A man who pretends to tell fortunes, or teach how to recover stolen goods (*Hudibras*).

CU'NNINGNESS. *s.* (from *cunning.*) Deceitfulness; sliness.

CUNOCEPHALI, in mythology, from κυων, a dog, and κεφαλη, head, a kind of baboons, or animals with heads like those of dogs, which were wonderfully endowed, and were preserved with great veneration by the Egyptians in many of their temples.

CUNONIA. In botany, a genus of the class decandria, order digynia. Corol five-petalled; calyx five-leaved; capsule two-celled, pointed, many-seeded; styles longer than the flower. One species only; a Cape shrub with unevenly pinnate leaves; leaflets lanceolate, glabrous, serrate; glands axillary; racemes terminal, simple.

CUP. *s.* (cup, Saxon.) 1. A small vessel to drink in (*Genesis*). 2. The liquor contained in the cup; the draught (*Waller*). 3. (In the plural.) Social entertainment; merry bout (*Ben Jonson*). 4. Any thing hollow like a cup (*Woodward*). 5. CUP *and Can.* Familiar companions (*Swift*) 6. (*couper*, French, to scarify.) A glass to draw the blood in scarification (*Arbuthnot*).

CUP, a vessel of capacity, of various forms and materials, chiefly to drink out of. In the German Ephemeris we have a description of a cup made of a common pepper-corn by Oswald Nerlinger, which holds 1200 other ivory cups, having each its several handle, all gilt on the edges; with room for 400 more. It will not be expected that we should answer for the truth of this account.

CUP, among herbalists. See CALYX.

CUP (Mushroom). See PEZIZA.

CUP (Shell). See SHELL.

To CUP. *v. a.* (from the noun.) 1. To supply with cups: obsolete (*Shakspeare*). 2. To fix a glass bell or cucurbite upon the skin, to draw the blood in scarifications (*Pope*).

CUPA, among the ancients, a kind of boats used in laying bridges over rivers: they were broad below, and narrow above.

CUPANIA. In botany, a genus of the class octandria, order monogynia. Calyx five-leaved; corol five-petalled, hooded at the tip; style three-cleft; capsule three-celled; three-valved; the cells one or two seeded; seeds coated. Three species; natives of the West Indies, and arboreous.

CUPAR, a royal borough in Fifeshire, and the county town. Lat. 56. 15 N. Lon. 2. 55 W.

CUPBE'ARER. *s.* 1. An officer of the king's household (*Wotton*). 2. An attendant to give wine at a feast.

CU'PBOARD. *s.* (*cup* and bopꝺ, Saxon.) A case with shelves, in which victuals or earthen ware is placed (*Bacon*).

To CU'PBOARD. *v. a.* (from the noun.) To treasure; to hoard up (*Shakspeare*).

CUPEL, a small crucible used in the process of cupellation. It is a solid paste of bone-ash moulded in a short cylindrical or truncated pyramidal form, with a shallow circular cavity at the top about the size of the segment of a large bullet. In making cupels the powdered bone-ash is moistened with a very little water, and the mass is shaped into the form demanded by being struck with considerable force into a mould of brass or iron, and afterwards gradually dried: by which means it acquires sufficient hardness for the purposes to which it is to be applied.

CUPELLATION, in chemistry, a particular mode of assay, by which the noble metals, as they are called, gold, silver, and platina, become separated from their alloys, through the medium of lead or some other highly oxydable metal, whose oxyd is at the same time easily fusible. See the article ASSAY.

The process of cupellation is performed in a furnace contrived for the purpose, and capable of giving a heat at least sufficient for an easy fusion of gold. In the middle of this furnace is placed an earthen pot, called a muffle, of an oven-form, vaulted at top, with a level floor at bottom, entirely open at one end and closed every where else, except in a few narrow slits through the sides. The open end comes in contact with a door at the side of the furnace, and is generally luted thereto, so as entirely to

separate it from the burning fuel. The body of the muffle is surrounded with the coals, and, before cupellation, is gradually heated to a glowing redness. Its use is to protect the small crucibles, or cupels, ranged on its floor, from any accidental impurity which the fuel might furnish, and at the same time to afford the melted metal a free access of heated air to promote the oxydation. The fire being kindled, the muffle, and empty cupels, are first heated gradually, till the whole are of a glowing red; a little powdered chalk or sand being previously sprinkled on the floor of the muffle, to prevent the adhesion of the cupels by the litharge (where litharge is used) soaking through them. They are then ready to receive the metal to be cupelled. It should be observed, that the cupels of bone-ash cannot absorb more than their own weight of litharge at the utmost; and hence the quantity of fine metal to be assayed should not require more lead than the weight of the cupel. The proportion of lead to the fine metal is determined by the estimated purity of the latter.

CUPID, in Pagan mythology, the god of love. The ancients give very different accounts of the origin of this little deity. The common opinion seems to have been that there were two Cupids, the one the son of Jupiter and Venus, whose delight it was to raise sentiments of love and virtue; and the other the son of Mars and the same goddess, who inspired base and impure desires. The first of these, called Eros, or True Love, bore golden arrows, which caused real joy, and a virtuous affection; the other, called Anteros, had leaden arrows, that raised a passion founded only on desire, which ended in satiety and disgust. Cupid was always drawn with wings, to represent his inconstancy; and naked, to shew that he has nothing of his own. He was painted blind, to denote that love sees no fault in the object beloved; and with a bow and quiver of arrows, to shew his power over the mind. Sometimes he is crowned with roses; sometimes he is placed between Hercules and Mercury, to shew the prevalence of eloquence and valour in love; and at others is placed near Fortune, to signify that the success of lovers depends on that inconstant goddess. Sometimes he is represented with an helmet on his head and a spear on his shoulder, to signify that love disarms the fiercest men; he rides upon the backs of panthers and lions, and uses their manes for a bridle, to denote that love tames the most savage beasts. He is likewise pictured riding upon a dolphin, to signify that his empire extends over the sea no less than land.

The famous statuary Praxiteles, who flourished about the 114th Olympiad, B.C. 324, acquired great honour by his statues of Cupid. The orations of Cicero against Verres have given celebrity to the marble Cupid, which the orator represents as a rival to one still more famous by the same artist, that formed the pride and the wealth of the Thespians: a statue spared by Memmius when he plundered the cities of Greece.

CUPI'DITY. *s.* (*cupiditas*, Latin.) Concupiscence; unlawful longing.

CUPOLA, in architecture, the same with dome.

CUPPEL. See CUPEL.

CU'PPER. *s.* (from *cup.*) One who applies cupping-glasses; a scarifier.

CUPPING, in surgery, the operation of applying a scarifying machine and cupping-glasses for the discharge of blood from the skin. See SURGERY.

CUPPING-GLASS, is a vessel formed somewhat like a bell, applied to several parts of the body in performing the operation of cupping.

CU'PREOUS. *a.* (*cupreus*, Latin.) Coppery; consisting of copper (*Boyle*).

CUPRESSUS. (*cupressus*, κυπρεσσος, or κυπαρισσος; so called, απο τȣ κυειν παρισσȣς τȣς ακρεμονας, because it produces equal branches; and hence the name ought rather to be cyparissus, which is a far better term than cupressus.) In botany, the cypress-tree: a genus of the class monoecia, order monodelphia. Male: calyx a scale of the ament; corolless; anthers four, sessile, without filaments. Female: calyx a one-flowered scale of the cone; corolless; styles concave dots; nut angular. Seven species; of which the following are those chiefly worthy of notice.

1. C. sempervirens. Evergreen cypress; with imbricate leaves, and quadrangular fronds; a native of Asia and the east of Europe; said to be an excellent preservative against worms, moths, and putrefactions; and hence formerly employed as coffins by the more wealthy of the Athenians, and as mummy chests by the Egyptians. Commonly supposed, also, to be the timber of which Noah constructed his ark. Every part of this tree was formerly used in medicine, though the whole has long since fallen into disrepute. It abounds, however, with a useful, bitter, aromatic, terebinthinate fluid; and is still said to be an antidote against the return of the pyrexia in intermittents.

2. C. thyoides. Evergreen American, or white cypress. A native of Canada, with an upright stem, ramifying into numerous two-edged branches, rising twenty or thirty feet high, ornamented with flat evergreen leaves; imbricated like the arbor vitæ, and possessed of blue cones, the size of juniper-berries.

3. C. disticha. Deciduous American cypress, with an erect trunk of large bore, branching wide and regular; grows fifty or sixty feet high, with small spreading deciduous leaves, arranged distichously, or along two sides of the branches.

All these species may be raised from seeds, or propagated by cuttings. The seedlings make the most elegant plants. The season for sowing is March: the soil should be common light earth placed in pots or tubs, should be plunged into a moderate hot bed: in this way they will be fit to remove into nursery rows in about twelve months.

CUPRUM. Copper. In mineralogy, a genus of the class metals. Fine red, easily tarnishing in the air, hard and tenacious, malleable

and ductile, sonorous and elastic; specific gravity 8.667: melting with difficulty, and when exposed to a red heat, taking fire and emitting a most brilliant green light; exploding violently when melted and cast into water; soluble in most acids and ammonia, exhibiting a blue colour. From its solution in nitric acid, it precipitates a blue oxyd by the addition of potash; tinges glass green. Thirty-two species: of which the following are the chief.

1. C. nativum. Native copper. Of this there are three varieties.

α. Uncombined.

β. Precipitated by a vitriolic solution.

γ. Crystallized in eight-sided figures. Found in Cornwall, Anglesea, Wicklow in Ireland, on the shores of the Copper island near Kamschatka, in Iceland, and the Feroe islands, Hungary, Siberia, Sweden, Norway, and many other parts of the old and new world; in compact masses, plate, threads, and arborescent and botryoidal figures of various forms; sometimes crystallized in cubes, or double four-sided pyramids; sometimes with a granulated, rarely with a lamellar texture; when hard and compact, takes a fine polish, and exhibits a rich metallic lustre, but soon tarnishes by the action of the air, and contracts a greenish rust, called verdigris. Specific gravity, from 7,600 to 8,667.

2. C. cuprigo. Cuprige. Carbonat of copper. Sky, or smalt blue, without metallic lustre, entirely soluble in acids with effervescence, and giving them a green colour. Found in most of the copper-mines of Europe; generally in small granular particles, dispersed through different stones; stalactitical, botryoidal, or crystallized in rhomboidal prisms, with four-sided summits: texture somewhat earthy; generally striate, or radiate: leaves a sky-blue trace, and is brittle. Specific gravity 3,608. Contains copper from 66 to 70; carbonic acid, from 18 to 20; oxygen, 8 to 10; water 2.

3. C. lateritium. Copper ochre. Earthy red ore. Red, soft, without metallic lustre. Found in the mines of Saxony, in compact lumps, sprinkled in small particles; colour hyacinth red, more or less inclining to brown or yellow; texture generally earthy, rarely imperfectly conchoidal, and often covering other fossils as with a crust; easily pulverisable, and making a considerable stain on paper; it often decrepitates and blackens in the fire, and is not totally soluble in acids, or volatile alkali: has a greater or less mixture of iron; and contains from 30 to 54 per cent. of oxyd of copper.

4. C. ærugo. Verdigris. Green copper ore. Green carbonat of copper: green, giving a blue colour to ammonia; effervescing with nitric acid; opaque, without metallic lustre. Of this there are four varieties.

α. Chrysocolla. Common mountain-green. Soft, bitter, of an earthy or minutely conchoidale fracture.

β. Compact malachite; hard, brittle, taking a fine polish, fracture conchoidal, finely fibrous or lamellar.

γ. Fibrous malachite; hard, brittle, of a fibrous or radiated fracture, and silky lustre.

δ. Crystallized in slender needles. Found in various copper-mines of Great Britain, Africa, Siberia, Hungary, Saxony, Bohemia, &c. in solid masses, or in small particles interspersed in different matrices, or in various forms, as kidney-shaped, botryoidal, stalactitical, or in concentric layers: colour from a dull to a light apple-green; lustre usually silky: before the blowpipe it decrepitates and blackens, but does not melt, and gives a green colour to the flame. Specific gravity, from 3,571 to 3,653.

A Siberian specimen contained,

Copper	58,0
Carbonic acid	18,0
Oxygen	12,5
Water	11,5
	100,0

5. C. arsenicale. Arseniat of copper. Olive copper ore. Found in the Carrack mines in Cornwall, and near Jonsback in Silesia, in clefts of quartz; colour various shades of green, sometimes inclining to brown, generally in transparent crystals of various forms. Specific gravity, from 2,548 to 4,208.

6. C. arenaceum. Muriat of copper. Green sand of Peru. Found at Peru, and when examined through a glass, appears to be a mixture of transparent green particles with quartz.

7. C. phosphoratum. Phosphat of copper. Found at Rheimbreidbach, near Cologne, in lumps, or dispersed through other minerals, or in minute six-sided clustered crystals; lustre glassy without, silky internally: makes an apple-green scratch.

8. C. fulvum. Mundic. Copper-pyrites. Yellow, with metallic splendour; emitting sulphurous flames and vapours when thrown on hot coals. The most common ore is in the mines of Cornwall, Ireland, Siberia, Hungary, Sweden, &c.; in innumerable varieties and proportions, massive, disseminated, or crystallized; colour light-yellow, or greenish-yellow, sometimes verging on steel-grey; when tarnished by the air, often variegated with gold-yellow, blue, green, or red; texture even or imperfectly conchoidal. Composed of copper and sulphur, with a little iron: it tinges borax green. Specific gravity, 4,160.

9. C. campanarum. Bell-metal ore. Hardish, ponderous, with metallic lustre, of a blueish steel colour. Found in Chili, and in Cornwall, near Whealrock; and consists of copper and tin-pyrites, with sometimes a little arsenic.

10. C. vitratum. Sulphuret of copper. Vitreous copper ore. Soft, with a metallic lustre, of a lead colour, easily melting before the blowpipe. Found in Cornwall, Hungary, Siberia, Bohemia, Austria, &c. in masses, plates, threads; or crystallized in cubes, six-sided prisms, or four-sided double pyramids; texture compact or foliated; it deflagrates with nitre, tinges borax green, and is soft enough to be cut with a knife. Specific gravity, from 5,432 to 5,565.

11. C. phlogisticum. Pitch ore. Bituminous copper. Black, burning slowly with a flame, and at last consuming to ashes. Found in Dalecarlia in Sweden, and in Siberia, resembling a piece of coal or bituminous schist. It consists of bituminous coal, or schale impregnated with oxyd of copper: the ore is extracted from the ashes with considerable difficulty.

Reduction of the Ores.

The reduction of copper ores in the large way, is on the whole a very simple business, being little else than a succession of roasting and reducing processes of the simplest kind, till the metal acquires the desired degree of malleability and purity. It is to be observed, that both arsenic and

sulphur adhere to copper with great obstinacy, even long after it has assumed the appearance of a pure regulus, and even in a very small proportion they make the metal brittle, hard, and difficult to work.

There are scarcely two works in which precisely the same order is observed in the different reducing processes (supposing the quality of the ore to be the same), and as the manufacturer is generally satisfied with that which has been long established, and is attended with ordinary success, he seldom enquires whether the labour may be shortened, or the expence diminished. The sulphuret of copper, which is obtained in such vast quantities at the Parys mine in Anglesea, is wrought into rough copper in the following manner. The ore is dug up in large pieces (being mostly obtained by blasting), and is first broken into smallish lumps by the hammer, chiefly by women and children, and put into a kiln, from which proceed flues that open into a very long, close pent-house gallery, to collect the sulphur; the kiln is covered close, and a little fire is applied to the mass of ore in different places, whereby the whole is gradually kindled. The sulphur then rises in vapour to the top of the kiln, and thence through the flue into the long gallery, where it slowly condenses, and is afterwards brushed out and farther prepared for sale. The mass of ore, when once kindled, continues to burn of itself with a mouldering heat for about six months, during which time the sulphur chamber is cleared out four times, after which the ore is sufficiently roasted. The old sulphur chambers are on a level with the kilns, and of the same length and height, or in fact they are a prolongation of the kilns: but the more modern and improved chambers are like lime kilns, the ore being at the bottom, and the sulphur subliming at the top, with a contrivance to take out the roasted ore, and thus to keep up a perpetual fire.

The richest part of the roasted ore is exported without farther preparation, but the poorest part is smelted on the spot. It still contains a vast quantity of sulphur and other impurities. The smelting houses are a range of large reverberating furnaces, thirty-one of which are under the same roof, ranged side by side in a single long row. They are all air furnaces, the chimneys of which are forty-one feet high, which causes a most powerful draught through them. The fuel is coal, which is burned on a grate at the anterior part of the furnace; and the flame in drawing up the chimney passes over the bed of the reverberatory, into which is put twelve hundred of roasted ore, previously mixed with a small portion of coal dust. The ore is here melted, and reduced into a very impure regulus, and when sufficiently fused, it is drawn off through a plughole into earthen moulds. A single charge of the furnace, or twelve hundred, yields half a hundred of rough copper, which by farther purification affords about fifty per cent. of pure malleable metal. The furnaces work off a single charge about every five hours.

The copper furnaces in Cornwall are also of the reverberating kind; the ore, when drawn up from the mine, is first broken into pieces no bigger than a hazel nut, which operation is called cobbing, and the better sort is picked out by the hand. The reduction begins by the process of roasting in large reverberating furnaces, fourteen feet by sixteen, the bottom or bed of which is made of fire bricks, and covered to the thickness of about two feet with silicious sand, which runs together by the heat into a semi-vitrified mass. The chimney is from forty to fifty feet high, which causes such a powerful draught, that the arsenic and sulphur separated during the roasting, pass almost entirely through the chimney into the open air, none of it being collected as at Anglesea. The ore is spread over the bottom of the furnace about a foot thick, being thrown in through a kind of funnel, or hopper: just above the fuel is Welch coal, which, as usual, is burnt at the anterior part of the furnace, and its flame draws over the surface of the ore in its passage to the chimney. In this furnace, which is called the calcining furnace, and is the largest of all, the ore is roasted without addition, with a dull red heat for twelve hours, and is frequently in that time stirred with a long iron rake, introduced through a hole at the farther end of the reverberatory, to expose fresh surfaces to the action of the flame. The ore is not melted here, but when roasted sufficiently, it is carried to another furnace exactly similar to the former, but smaller, that is, about nine feet by six; and here it receives a fusing heat, but still without any addition, except when the slag does not rise freely, a little calcareous sand is thrown in. At the end of every four hours the slag is raked out; it is then of the consistence of soft dough, and is laded into oblong moulds, and a little water is sprinkled upon it to make it sink down; after which the moulds are quite filled with it, and when cold, it makes hard solid blocks of slag about fourteen inches long, and twelve deep and broad, which are used for building. After the slag is raked off, a fresh charge of calcined ore is let down into the reverberatory, and the copper is tapped off by a hole in the side of the furnace, which before the fusion had been topped up with a shovel full of wet clay, mixed with about a fourth of new coal, which prevents the clay from hardening too much, so that the hole may readily be opened by an iron pick.

The rough copper, as it runs from the furnace, is conveyed by a gutter into a large kind of bucket, suspended by chains, in a well through which a stream of water is passing, and here, in falling into the water, the metal is granulated, which takes place without explosion or danger, and it is then drawn out by raising the bucket. The copper is still, however, extremely impure, though apparently in the metallic state, being grey, and perfectly brittle, and still mixed with arsenic and sulphur, to separate which is the work of several subsequent processes. It is then re-melted and granulated twice more or oftener, each time throwing up a slag in the furnace, which is removed before the plug-hole is tapped; but as this slag contains some copper, it is not cast into moulds as the first, but worked over and over again with the fresh charges of calcined ore. The number of fusions and granulations is entirely determined by the nature of the ore. The granulated mass is then melted and cast into pigs, which have a blistered appearance on the surface, and are broken up and roasted for one or two days in a low red heat, and again melted and roasted as before for several times, till the metal is considerably purer; and at last is cast in oblong iron moulds about fourteen inches in length, when it is removed to the refining furnace. Here it is again melted with the addition of a little charcoal, till it is brought to a sufficient purity to bear the hammer, and is now good saleable copper.

It is observable, that in the former process, when the crude and brittle metal is cast in sand in

the form of large pigs or ingots, the best part of the copper rises to the surface, and when cold, may be knocked off with a hammer, forming a brittle crust about three quarters of an inch thick, of a grey colour, and a steel-like fracture.

Thus by a series of successive calcinations and fusions in the simplest manner possible, the common copper ores are freed from arsenic, sulphur, and earthy matters, and gradually brought to the state of malleable copper. Where a variety of ores, from different places, and of different species, are brought to the same smelting house (which is the case in many of the houses at Swansea, and different parts of the Bristol coast), much technical judgment is exercised in sorting the ores, and distributing the charges for the furnace, in such a manner that the more fusible will assist the reduction of the refractory, and the poorer will be made more worth working by the addition of a portion of the richer ores and the like.

The subsequent operations, whereby the ingots or pigs of malleable copper are formed into sheet copper, wire, nails, bolts, cauldrons, and an infinite variety of manufactured articles, do not come within the province of pure chemistry: it may be sufficient to observe, that the hammering renders the metal much more uniform, close, and ductile, but this requires to be frequently alternated with annealing at a full red heat, to prevent the metal from cracking under the powerful pressure to which it is exposed. Immediately after the last annealing, the copper plates are quenched in urine, which somewhat hardens the surface, and gives it that redness which is considered by the merchant as one mark of the purity of the metal.

The plates of fine red copper, called rosette copper, are made in the following way. When the refined copper is found, by the way just mentioned, to be sufficiently pure, the surface of the melted metal is well scummed, and suffered to cool till it is ready to fix, at which time a workman brushes it over with a wet broom, which immediately fixes the surface, and causes a thin plate to separate from the still fluid metal below. This plate is taken off and thrown into water, where it takes a high red colour; and the same process of wetting the surface is repeated with the remaining fluid metal successively, till the whole is reduced to these thin irregular plates.

A considerable quantity of copper is obtained from the springs of native sulphat of copper, or blue vitriol, which are found in most copper mines, or flow from hills containing this metal. To obtain it, the vitriol water is pumped up into large square open pits, two or three feet deep, made with rammed clay, into which is thrown a quantity of refuse iron of any kind, and suffered to remain for a considerable time, during which the iron is dissolved, displacing by superior affinity the copper, which is precipitated in the form of a brown mud. When the water is thus exhausted of its copper, the pits are raked out, and the oxyd collected from them is simply dried in the sun. It is then fit for reduction in the reverberatory furnaces in the usual manner.

Analysis of Copper Ores.

The analysis may be conducted in the dry, or the moist way. Each has its peculiar advantages and defects.

In the dry way, the ores when they contain sulphur or arsenic (which is the case with the greater number), are first roasted, in order to dissipate the greater part of these mineralising substances. For this purpose, in analysis in the small way, they are mixed with about their bulk of charcoal powder, or fine sawdust, which is better, and exposed to a low red heat on a flat tile or muffle, or any other convenient apparatus on which they can be thinly spread.

The sulphur, or arsenic, soon begins to rise in fumes, which should be hastened by frequent stirring, keeping the heat just below the point at which the ore would run and clot together, to prevent which is one considerable use of the charcoal or sawdust.

When no more fumes sensibly arise, and the charcoal is entirely burnt off, the part of the ore that remains now consists of the metallic portion in the state of an oxyd, still mixed, however, with a quantity of sulphur or arsenic, which mere roasting will not separate, and of all the earthy matrix that may have been originally contained.

The ore is then fitted for the second process, which is that of reduction of the metallic oxyds to the reguline state. All that is essentially necessary to reduction, is to expose the oxyd to a high heat in contact with charcoal, or other carbonaceous matter, and secluded from the contact of air. It has been a constant custom with chemists in almost all cases (till of late years) to add to the ore in reduction, not only a due quantity of carbonaceous matter, but also to mix with it a large proportion (seldom less than thrice its weight) of some alkaline or easily vitrifiable matter, to serve as a flux, to promote the fusion of all the heterogeneous contents of the ore, and to afford a thin-flowing medium, through which the globules of the reduced metal can readily fall by their superior gravity, and at last be collected in a single mass or button at the bottom of the crucible. The mischief of these saline fluxes, however, is that they constantly dissolve a portion of the metallic oxyd before it has time to pass to the metallic state and retain it permanently, thus robbing the metallic button of a part of what would otherwise augment it.

The analysis of copper ores in the moist way is performed in a tolerably uniform manner, the ore being first treated with an acid which dissolves all the metallic part, leaving whatever sulphur or silex the ore may possess: after which the different metals, of which the metallic part consists, whether silver, antimony, iron, tin, or nickel, are separately precipitated from the solution, either in the metallic state, or in certain known forms of combination, from which the metallic portion can be accurately inferred.

Copper Alloys.

The alloys in which copper predominates are peculiarly numerous and important. Many of them are perfectly well known, and have been in use from very early times: of others the exact composition, and particularly the mode of preparation, are kept as secret as possible; for even when the precise composition of an alloy is found by chemical analysis, it may often be extremely difficult to produce a mixture by common methods, which shall have exactly the same shade of colour, the same malleability, texture, susceptibility of polish, or some other excellence, which, perhaps, a mere accident has discovered to the possessor.

The principal objects of alloying copper appear to be to render it less liable to tarnish, and especially to be acted on by common animal or vegetable substances, to make it more fusible and harder, and able to take a higher polish, and to

alter its colour either to a golden yellow or silvery white. All these objects are attainable by different alloys. Copper alloyed with gold, silver, and platina, is seldom, if ever, used in the proportions in which it would be reckoned as alloy of copper, being much too costly for any purpose of manufacture; with this exception, however, that a very small portion of silver much improves the composition of the alloy of copper and tin, when used as bell-metal or speculum-metal. Copper is used largely as an alloy of gold and silver, and it is often plated with one or the other.

Tutenag is a white alloy of copper, zinc, and iron, according to Keir, which is very hard, tough, and sufficiently ductile to be wrought into various articles of furniture, such as candlesticks, &c. which take a high polish, and when made of the better sort of tutenag are hardly distinguishable from silver. The inferior kinds are still white, but with a brassy yellow. The Chinese petong is another fine, white, malleable alloy of copper, the composition of which is not exactly known, but it contains a small portion of silver. Copper unites with lead very intimately by fusion, but when a mass of this alloy is exposed to a heat less than that at which the whole melts, the lead alone sweats out, leaving almost all the copper in a porous or honeycombed state. When the copper holds a small portion of silver, the lead carries the latter out with it, and this is the principle of the old process of eliquation, formerly much used in the extracting of silver from copper ores. Copper, with about a fourth of its weight of lead, forms pot-metal, used by the ancients for their coins.

Copper nearly saturated with zinc forms brass, the most important of all the alloys of this metal. (See BRASS). With a much less proportion of zinc the colour of the alloy approaches very nearly to that of gold, and the malleability increases. Mixtures chiefly of these two metals are used to form a variety of yellow or gold-coloured alloys, known by the names of tombac, Manheim, or Dutch gold, tinsel, similor, prince Rupert's metal, Pinchbeck, &c.; but the precise composition varies according to the fancy or the experience of different manufacturers. The Dutch gold may be beaten out into extremely fine leaves, which, when fresh, have nearly the brilliance of gold-leaf, and are used as a cheap imitation of it; but they tarnish very soon. The mixture may be made, either by directly melting copper and zinc, or by mixing brass and copper. In either case the copper should be melted first, and the zinc added afterwards, the whole stirred together with wood, covering it with a little charcoal, and poured out immediately, to prevent the loss by the burning off the zinc. A kind of tombac is the material of which a large proportion of the Roman coins was composed. Klaproth on analyzing several struck during the first century of the emperors, found them all to consist either of pure copper, or of copper and zinc, in which the latter metal made generally from a fifth to a sixth of the mass. A little tin and lead were found in some; but in such small proportion as to appear only an accidental impurity.

The alloys of copper and tin are extremely important in the arts, and curious as chemical mixtures. They form, in different proportions, mixtures which have a distinct and appropriate use. Tin added to copper makes it more fusible; much less liable to rust or corrosion by common substances; harder, denser, and more sonorous. In these respects the alloy has a real advantage over unmixed copper; but this is in many cases more than counterbalanced by the extreme brittleness which even a moderate portion of tin imparts, and which is a singular circumstance, considering how very malleable both metals are before mixture, and the remarkable softness and ductility of tin.

Copper, or sometimes copper with a little zinc, alloyed with as much tin as will make from about one-tenth to about one-fifth of the whole, forms an alloy, which is the principal and often the only composition for bells, the cannon improperly called brass, bronze statues, and several inferior purposes; and hence it is called bronze or bell-metal (always observing that there is no perfect uniformity in the different alloys under these names, either in the proportion or the actual number of ingredients), and it is excellently fitted for these purposes by its hardness, density, sonorousness, and fusibility, whereby the minutest parts of hollow moulds may be readily filled before it fixes in cooling. For cannon, a lower portion of tin seems to be used. According to Dr. Watson, the metal employed at Woolwich is one hundred parts of copper, with from eight to ten of tin. Hence it still retains some little malleability, and of course is tougher than with more tin.

Bronze cannon are much less liable to rust than those of iron; but in large pieces of ordnance, by very rapid firing, the touch-hole is apt to melt down, and spoil the piece; of which there is a remarkable instance at the Tower of London, of a mortar of the largest calibre thus spoiled at the siege of Namur. On account of the sonorousness of bronze, these cannon give a much sharper report than those of iron, which for a time impairs the hearing of the people that work them. A common alloy for bell-metal is about eighty of copper to twenty of tin; or where copper, brass, and tin are used, the copper is from seventy to eighty per cent. including the portion contained in the brass, and the remainder is tin and zinc. The zinc certainly makes it more sonorous. Antimony is also often found in small quantity in bell-metal. Some of the finer kinds used for small articles contain also a little silver, which much improves the sound.

When the tin is nearly one-third of the alloy, it is then most beautifully white, with a lustre almost like that of mercury, extremely hard, very close-grained, and perfectly brittle. In this state it takes a most beautiful polish, and is admirably fitted for the reflection of light for all optical purposes. It is then called speculum metal, which, however, for the extreme perfection required in modern astronomical instruments, is better mixed with a very small proportion of other metals, particularly arsenic, brass, and silver.

When more tin is added than amounts to half the weight of the copper, the alloy begins to lose that splendid whiteness for which it is so valuable as a mirror, and becomes more of a blue-grey. As the tin increases, the texture becomes rough-grained, and as it were rotten, and totally unfit for manufacture. The speculum metal is therefore in the highest proportion of alloy of tin that copper will admit, for any useful purpose. See Aikin's Dictionary of Chemistry. Dizé Jour. Phys. Watson's Essays.

CUPTREA. In botany, a genus of the class dodecandria, order monogynia. Calyx six-toothed, unequal; petals six, unequal, in-

serted into the calyx; capsule one-celled, with a three-sided follicle. One species only; a Brasil plant.

CUR. *s.* (*korre*, Dutch.) 1. A worthless degenerate dog (*Dryden*). 2. A term of reproach for a man (*Shakspeare*).

CU'RABLE. *a.* (from *cure.*) That admits a remedy; that may be healed (*Dryden*).

CU'RABLENESS. *s.* (from *curable.*) Possibility to be healed.

CURACOA, or CURASSOU, an island of America, about twenty-eight miles from the continent of Terra Firma, subject to the Dutch, being about twenty-five miles long, and twelve broad. The harbour is a good one, and stands on the south-east part of the island, where the Dutch have one of the neatest and most elegant towns in the West Indies. The public buildings are handsome and numerous, and the private houses convenient. The magazines are well stored, and are large and commodious. This island is naturally barren; but the industry of the Dutch has rendered it capable of producing both sugar and tobacco; and has raised here some good salt-works, which carry on a great trade. In times of peace, the trade of this island is said to be worth no less than 500,000*l.* per annum to the Dutch; but it is much greater in the times of war, as it then becomes the common emporium of the West Indies. Lat. 11. 56 N. Lon. 68. 20 W.

CU'RACY. *s.* (from *curate.*) Employment of a curate; employment which a hired clergyman holds under the beneficiary (*Swift*).

CURASSOU. In ornithology. See PENELOPE and CRAX.

CURATE, is properly a parson or vicar of a parish, who has the charge or cure of the parishioners' souls.

CURATE is now more generally used for a deputy, or substitute of the parson, or one who officiates in the place of the incumbent, or beneficiary. In case of pluralities of livings, or where a clergyman is old and infirm, it is requisite there should be a curate to perform the cure of the church. He is to be licensed, and admitted by the bishop of the diocese, or by an ordinary having episcopal jurisdiction; and when a curate hath the approbation of the bishop, he usually appoints the salary too; and in such case, if he be not paid, the curate hath a proper remedy in the ecclesiastical court, by a sequestration of the profits of the benefice; but if the curate is not licensed by the bishop, he is put to his remedy at common law, where he must prove the agreement, &c. A curate having no fixed estate in his curacy, not being instituted and inducted, may be removed at pleasure by the bishop or incumbent. But there are perpetual curates as well as temporary, who are appointed where tithes are impropriate, and no vicarage endowed: these are not removeable, and the impropriators are obliged to find them; some whereof have certain portions of the tithes settled on them. Every clergyman that officiates in a church (whether incumbent or substitute) in the liturgy is called a curate. Curates must subscribe the declaration according to the act of uniformity, or are liable to imprisonment, &c. The laws respecting the provision to be made for the support of curates are about to undergo some revision.

CURATELLA. In botany, a genus of the class polyandria, order monogynia. Calyx five-leaved; petals four; styles two; capsule two-parted; the cells two-seeded. One species only; a native of South America.

CU'RATESHIP. *s.* (from *curate.*) The same with curacy.

CU'RATIVE. *a.* (from *cure.*) Relating to the cure of diseases; not preservative (*Brown*).

CURATOR, an officer under the Roman emperors, who regulated the prices of all kinds of vendible commodities in the empire.

CURATOR OF AN UNIVERSITY, in the United Provinces, is an elective office, to which belongs the direction of the affairs of the university; as, the administration of the revenues, the inspection of the professors, &c. The curators are chosen by the states of each province: the university of Leyden has three; the burghermasters of the city have a fourth.

CURB, in the manage, a chain of iron made fast to the upper part of the branches of the bridle, in a hole called the eye, and running over the beard of the horse. The curb of a horse's bridle consists of the following parts: 1. The hook fixed to the eye of the branch. 2. The chain of SS, or links. 3. The two rings or mails. Large curbs, provided they be round, are always the most gentle.

CURB, in the manage, is also the name of a tumour situated on the back part of the hinder leg of a horse, immediately below the hock, probably the result of local injury, or too violent labour. Mild blistering frequently succeeds, particularly where the operation is twice performed; but when the case is of long standing, a few slight feather strokes with the firing-iron may be necessary to effect the cure.

CURB, used metaphorically, signifies restraint, inhibition, opposition.

To CURB. *v. a.* (from the noun.) 1. To guide a horse with a curb (*Milton*). 2. To restrain; to inhibit; to check (*Spenser*).

CURCULIGO. In botany, a genus of the class hexandria, order monogynia. Corol six-petalled, flat; spathe one-valved; style very short; stigmas three, diverging; capsule one-celled, four-seeded, spongy, beaked. One species only; a native of Coromandel.

CURCULIO. Weevil. In zoology, a genus of the class insecta, order coleoptera. Antennas clavate, seated on the snout, which is horny and prominent; feelers four, filiform.

The larvas of this most splendid tribe have six scaly legs, and a scaly head: some of them infest granaries, eating their way into the grains of corn, and leaving nothing but the husk: some dwell in other seeds, or are lodged in the inside of artichokes, thistles, and various other plants; and others devour the leaves of trees and herbs. The species are very numerous, and amount to not less than six hundred and fifty-three that have been specifically ascer-

tained and described. They are scattered over the globe, and may be thus subdivided into sections.

A. Jaw cylindrical, one-toothed: comprising the family named curculio by Fabricius. These, again, are distinguished by having

α. Snout longer than the thorax; thighs unarmed.

β. Snout longer than the thorax; thighs toothed.

γ. Snout longer than the thorax; hind-thighs formed for leaping.

δ. Snout shorter than the thorax; thighs unarmed.

ε. Snout shorter than the thorax; thighs toothed.

B. Lip bifid; jaw bifid, short; snout short: embracing the tribe anthribus of Fabricius.

C. Lip rounded, horny; feelers very short: the brachycerus of Fabricius.

The species mostly worthy of notice are the following.

1. C. nucum. Nut weevil. Body brown; snout long, slender, curved; length from the tip of the snout to the end of the body, nearly half an inch. The complete insect is the parent of the maggot, so frequently found in the hazel-nut. It appears early in August, and is seen creeping about hazel-trees. The female when ready to deposit her eggs, singles out a nut, which she pierces with her proboscis, and then turning round, drops an egg into the cavity. She passes on, pierces another nut, drops another egg, and so continues till she has exhausted her entire stock. The nut not essentially injured continues to grow. The egg is soon hatched; the young maggot or larva finds its food prepared for it, and about the time of its full growth, falls with the ripened nut to the ground, and at length creeps out by gnawing a circular hole in the side. It then burrows or creeps under the surface of the ground, where it continues dormant for eight months; it then casts its skin, commences a chrysalis of the shape and appearance of the rest of the beetle tribe; and in the beginning of August, attaining its complete form, it throws off the spoil of the chrysalis, creeps to the surface, and becomes an inhabitant of the upper world. See Nat. Hist. Plate LXXII.

2. C. granarius. Granary-weevil. Colour uniform dull chesnut, or reddish brown; length scarcely two lines. It deposits an egg in various grains of wheat or barley, in the same manner as c. nucum in the hazel-nut, which undergoes the same process of transmigration as the c. nucum egg, but in a much shorter period of time, the perfect insect being accomplished in about twenty-one days. The egg is of about the size of a grain of sand.

3. C. imperialis. Imperial weevil, or diamond beetle. Ground colour of the wing-sheaths coal-black, with numerous parallel rows of sparkling indentations round, and of a green-gold colour, highly brilliant, from minute reflecting scales, like the scales of the butterfly. The most brilliant and beautiful of the insect class. A native of Brasil.

CURCUMA. Turmeric. In botany,* a genus of the class monandria, order monogynia. Calyx bifid; corol four-parted; nectary three-lobed; anther two-spurred at the base. Two species; both natives of India.

1. C. rotunda; with ovate lanceolate leaves, ornamented with a very few lateral nerves: the root an ovate bulb; stemless; but possessed of pale, spiked flowers.

2. C. longa; leaves lanceolate, with very numerous lateral nerves; stemless; with fleshy, palmate root, and white sessile flowers. The root of both species is imported in its dried state, and for the same purposes. Externally it is of a pale yellow colour, wrinkled, solid, ponderous, and the inner substance of a deep saffron or gold colour: its odour is somewhat fragrant; to the taste it is bitterish, slightly acrid, exciting a moderate degree of warmth in the mouth, and on being chewed it tinges the saliva yellow. It is now very seldom used medicinally, but retains a place in our pharmacopœias.

CURD. *s.* The coagulation of milk (*Pope*).

To CURD. *v. a.* (from the noun.) To turn to curds; to cause to coagulate (*Shakspeare*).

CURDISTAN, a country of Asia, seated between the Turkish empire and Persia, lying along the eastern coast of the river Tigris, and comprehending great part of the ancient Assyria.

To CU'RDLE. *v. n.* (from *curd.*) To coagulate; to concrete (*Bacon*).

To CU'RDLE. *v. a.* To cause to coagulate; to force into concretions (*Floyer*).

CURDLING, the coagulation of any particular fluid, such as milk. In Tuscany, it is effected by means of artichoke flowers, instead of the rennet employed in Britain. There are, besides, a variety of substances which may be advantageously substituted for either, especially when the whey is intended to be a cooling and antiseptic beverage; for instance, a small quantity of cream of tartar; a few drops of oil of vitriol, or spirit of salt, previously diluted in a spoonful of water, will easily coagulate the milk; after which it should be strained. See CHEESE.

CU'RDY. *a.* (from *curd.*) Coagulated; concreted; full of curds; curdled (*Arbuthnot*).

CURE. *s.* (*cura*, Latin.) 1. Remedy; restorative (*Granville*). 2. Act of healing (*Luke*). 3. The benefice or employment of a curate or clergyman (*Collier*).

To CURE. *v. a.* (*curo*, Latin.) 1. To heal; to restore to health; to remedy; to recover (*Waller*). 2. To prepare in any manner so as to be preserved from corruption (*Temple*).

CU'RELESS. *a.* (*cure* and *less.*) Without cure; without remedy (*Shakspeare*).

CU'RER. *s.* (from *cure.*) A healer; a physician (*Shakspeare. Harvey*).

CURETES, in antiquity, the same as corybantes.

CURFEW, or COURFEW, a signal given in cities taken in war, &c. to the inhabitants to

go to bed. Pasquin says, it was so called, as being intended to advertise the people to secure themselves from the robberies and debaucheries of the night. The most noted curfew in England was that established by William the Conqueror, who appointed, under severe penalties, that, at the ringing of a bell at eight o'clock in the evening, every one should put out their lights and fires, and go to bed: whence, a bell rung about that time was long called a curfew-bell.

CURIA, in Roman antiquity, denoted, 1. The senate-house. 2. A portion or division of a tribe, containing an hundred men. 3. The places where the curiæ used to assemble. In our ancient customs, the assembly of the bishops, peers, and great men, to celebrate the chief festivals of the year, was also called curia.

Curia baronum. See Court-baron.

Curia claudenda, is a writ that lies against him who should fence and inclose the ground, but refuses or defers to do it.

CURIA'LITY. *s.* (*curialis*, Latin.) The privileges, or retinue, of a court (*Bacon*).

CURIATII, a family of Alba, which was carried to Rome by Tullus Hostilius, and entered among the patricians. The three Curiatii, who engaged the Horatii, and lost the victory, were of this family.

CURIO, the chief and priest of a curia. Romulus, upon dividing the people into curiæ, gave each division a chief, who was to be priest of that curia, under the title of curio and flamen curialis. His business was to provide and officiate at the sacrifices of the curia, which were called curionia; the curia furnishing him with a sum of money on that consideration, which pension or appointment was called curionium.

Curio (Quintius), an excellent orator, who called Cæsar in full senate, "Omnium mulierum virum, et omnium virorum mulierum." (*Tacitus*). His son, C. Scribonius, was tribune of the people, and saved Cæsar's life as he returned from the senate-house, after the debates concerning the punishments which ought to be inflicted on the adherents of Catiline. He killed himself in Africa.

CURIO'SITY. *s.* (from *curious.*) 1. Inquisitiveness; inclination to inquiry. 2. Nicety; delicacy (*Shakspeare*). 3. Accuracy; exactness (*Ray*). 4. An act of curiosity; nice experiment (*Bacon*). 5. An object of curiosity; rarity (*Addison*).

CURIOSUS, an officer of the Roman empire during the middle age, appointed to take care that no frauds or irregularities were committed.

CU'RIOUS. *a.* (*curiosus*, Latin.) 1. Inquisitive; desirous of information (*Davies*). 2. Attentive to; diligent about (*Woodward*). 3. Accurate; careful not to mistake (*Hooker*). 4. Difficult to please; solicitous of perfection; full of care (*Taylor*). 5. Exact; nice; subtile (*Holder*). 6. Artful; nicely diligent (*Fairfax*). 7. Elegant; neat; laboured; finished (*Exodus*). 8. Rigid; severe; rigorous (*Shakspeare*).

CU'RIOUSLY. *ad.* 1. Inquisitively; studiously (*Newton*). 2. Elegantly; neatly (*South*). 3. Artfully; exactly. 4. Captiously.

CURIUS DENTATUS MARCUS ANNIUS, a Roman, celebrated for his fortitude and frugality. He was three times consul, and was twice honoured with a triumph. He obtained decisive victories over the Samnites, the Sabines, and the Lucanians, and defeated Pyrrhus near Tarentum. The ambassadors of the Samnites visited his cottage, while he was boiling some vegetables in an earthen pot, and attempted to bribe him by the offer of large presents. He refused them with contempt, and said, "I prefer my earthen pots to all your vessels of gold and silver, and it is my wish to command those who are in possession of money, while I am deprived of it, and live in poverty." (*Plutarch*).

To CURL. *v. a.* (*krollen*, Dutch.) 1. To turn the hair in ringlets (*Shakspeare*). 2. To writhe; to twist. 3. To dress with curls (*Shakspeare*). 4. To raise in waves, undulations, or sinuosities (*Dryden*).

To Curl. *v. n.* 1. To shrink into ringlets (*Boyle*). 2. To rise in undulations (*Dryden*). 3. To twist itself (*Dryden*).

Curl. *s.* (from the verb.) 1. A ringlet of hair (*Sidney*). 2. Undulation; wave; sinuosity; flexure (*Newton*).

CURLEW. In ornithology. See Scolopax.

CURMI, a name given by the ancients to a sort of malt liquor or ale. It was made of barley, and was drunk by the people of many nations instead of wine.

CURMU'DGEON. *s.* (*cœur mechant*, Fr.) An avaricious churlish fellow; a miser; a niggard; a griper (*Locke*).

CURMU'DGEONLY. *a.* (from *curmudgeon.*) Avaricious; covetous; churlish; niggardly (*L'Estrange*).

CURRANT-TREE. See Ribes.

CURRANTS, the fruit of a species of grossularia. (See Ribes.) The white and red sort are mostly used; for the black, and chiefly the leaves, upon first coming out, are in use to flavour English spirits, and counterfeit French brandy. The jelly of black currants is reckoned very efficacious in curing inflammations of the throat.

Currants also signify a smaller kind of grapes, brought principally from Zante and Cephalonia. They are gathered off the bushes, and laid to dry in the sun, and so put up in large butts. They are used for culinary purposes chiefly.

CU'RRENCY. *s.* (from *current.*) 1. Circulation; power of passing from hand to hand (*Swift*). 2. General reception. 3. Fluency; readiness of utterance. 4. Continuance; constant flow (*Ayliffe*). 5. General esteem; the rate at which any thing is vulgarly valued

(*Bacon*). 6. The papers stamped in the English colonies by authority, and passing for money.

CU'RRENT. *a.* (*currens*, Latin.) 1. Circulatory; passing from hand to hand (*Genesis*). 2. Generally received; uncontradicted; authoritative (*Hooker*). 3. Common; general (*Watts*). 4. Popular; such as is established by vulgar estimation (*Grew*). 5. Fashionable; popular (*Pope*). 6. Passable; such as may be allowed or admitted (*Shakspeare*). 7. What is now passing; what is at present in its course.

CU'RRENT. *s.* 1. A running stream (*Boyle*). 2. Currents are progressive motions of the water of the sea in several places (*Harris*). 3. Course; progression (*Bacon*).

CURRENT. (from *curro*, I run.) In hydrography, a stream or flux of water in any direction. The setting of the current, is that point of the compass towards which the waters run; the drift of a current, is the rate it runs an hour.

Currents, in the sea, are either natural and general, as arising from the diurnal rotation of the earth on its axis; or accidental and particular, caused by the waters being driven against promontories, or into gulphs and streights, where, wanting room to spread, they are driven back, and thus disturb the ordinary flux of the sea.

The currents are so violent under the equator, where the motion of the earth is greatest, that they hurry vessels very speedily from Africa to America; but absolutely prevent their return the same way: so that ships are forced to run as far as the 40th or 45th degree of north latitude, to fall into the return of the current again, to bring them home to Europe. It is shewn by governor Pownal, that this current performs a continual circulation, setting out from the Guinea coast in Africa, for example, from thence crossing straight over the Atlantic ocean, and so setting into the gulph of Mexico by the south side of it; then sweeping round by the bottom of the gulph, it issues out by the north side of it, and thence takes a direction north-easterly along the coast of North America, till it arrives near Newfoundland, where it is turned by a rounding motion backwards across the Atlantic again, upon the coasts of Europe, and from thence southward again to the coast of Africa, from whence it set out.

In the streights of Gibraltar, the currents set in by the south side, sweep along the coast of Africa to Egypt, by Palestine, and so return by the northern side, or European coasts, and issue out again by the northern side of the streights. In St. George's channel too they usually set eastward. The great violence and danger of the sea in the streights of Magellan, is attributed to two contrary currents setting in, one from the South, and the other from the North sea.

CURRENTS, in navigation, are certain settings of the stream, by which ships are compelled to alter their course or velocity, or both, and submit to the motion impressed upon them by the current. The knowledge of them being so necessary an article in navigation, we shall shew a more accurate way of discovering the way they set, together with their strength, than that of guessing by the ripplings of the water, and by the driving of the froth along shore. Take your ship's boat, with three or four men, a compass, a log-line with a large log to it, and a kettle or iron pot, with a coil or two of inch-rope fastened to its bale. When at a proper distance from the ship, heave your kettle overboard, and let it sink 80 or 100 fathoms, which will ride the boat nearly as fast as if at anchor. Heave your log, and turn your half-minute glass, observing at the same time to set the drift of the log by the compass: then will the knots run out during the half-minute, give the current's strength, and the compass its setting. Now to know how to make proper allowances for currents, it is evident, if a current sets just with the course of the ship, then the motion of the ship is increased by as much as is the drift or velocity of the current; and if a current sets directly against the ship's course, then the motion is retarded in proportion to the velocity of the current. Hence it is plain, 1. If the velocity of the current be less than that of the ship, then the ship will get so much ahead, as is the difference of these velocities. 2. If the velocity of the current be greater than that of the ship, then the ship will fall so much astern as is the difference of these velocities. 3. If the velocity of the current be equal to that of the ship, then the ship will stand still, the one velocity destroying the other.

If the current thwarts the course of a ship, then it not only lessens or augments her velocity, but gives her a new direction; compounded of the course she steers, and the setting of the current. Suppose a ship sails by the compass directly south, 96 miles in 24 hours, in a current that sets east 45 miles in the same time: required the ship's true course and distance. It is evident that the ship will run upon the diagonal of a parallelogram, of which the sides are 96 and 45: the length of this diagonal is found to be 106 miles, equal to $\sqrt{96^2+45^2}$. See NAVIGATION.

See also Robertson's Navigation, vol. ii. book 7. sect. 8, where the sailing in currents is largely exemplified.

CURRENTS (Under), are distinct from the upper or apparent, and in different places set or drive a contrary way. Dr. Thomas Smith, Phil. Trans. No. 158, makes it highly probable, that in the Downs, in the streights of Gibraltar, &c. there is an under-current, whereby as much water is carried out, as is brought in by the upper-currents. This he argues from the offing between the north and south Foreland, where it runs tide and half-tide, i. e. it is either ebb or flood in that part of the Downs three hours before it is so off at sea: a certain sign, that though the tide of flood runs aloft, yet the tide of ebb runs under-foot, i. e. close by the ground; and so at the tide of ebb it will flow under-foot. This he confirms by an experiment in the Baltic Sound, communicated

to him by an able seaman present at the making it: being there, then, with one of the king's frigates, they went with their pinnace into the mid-stream, and were carried violently by the current. Soon after that, they sunk a basket with a large cannon-bullet, to a certain depth of water, which gave check to the boat's motion; and sinking it still lower and lower, the boat was driven a-head to the windward, against the upper-current; the current aloft not being above four or five fathom deep. He added, that the lower the basket was let down, the stronger the under-current was found. From this principle, it is easy to account for that continual in-draught of water out of the Atlantic into the Mediterranean, through the streights of Gibraltar; a passage about twenty miles broad: yet, without any sensible rising of the water along the coasts of Barbary, &c. or any overflowing of the lands, which there lie very low.

CU'RRENTLY. *ad.* (from *current.*) 1. With a constant motion. 2. Without opposition (*Hooker*). 3. Popularly; fashionably; generally. 4. Without ceasing.

CU'RRENTNESS. *s.* (from *current.*) 1. Circulation. 2. General reception. 3. Easiness of pronunciation (*Camden*).

CURRICULUS, in our ancient writers, denotes the year, or course of a year.

CU'RRIER. *s.* (*coriarius*, Latin.) One who dresses and pares leather for those who make shoes, or other things (*L'Estrange*).

No currier shall use the trade of a butcher, tanner, &c. or shall curry skins insufficiently tanned, or gash any hide of leather, on pain of forfeiting for every hide or skin, 6*s.* 8*d.* If any currier do not curry leather sent to him, within sixteen days between Michaelmas and Lady-day, and in eight days at other times, he shall on conviction thereof forfeit 5*l.* 12 Geo. II. c. 25. Every currier or dresser of hides in oil shall annually take out a licence from the commissioners or officers of excise. Several of these regulations, however, have been altered by a late law.

CU'RRISH. *a.* (from *cur.*) Having the qualities of a degenerate dog; brutal; sour; quarrelsome; churlish (*Fairfax*).

CURRODREPANUS. (formed of *currus*, chariot, and δρεπανον, scythe or sickle.) In antiquity, a kind of chariot armed with scythes. The driver of this chariot was obliged to ride on one of the horses, as there was no other seat for him; the usual place for him being all armed with knives.

To CU'RRY. *v. a.* (*corium*, Latin, leather.) 1. To dress leather, by beating and rubbing it. 2. To beat; to drub; to thrash (*Addison*). 3. To rub a horse with a scratching instrument, so as to smooth his coat (*Bacon*). 4. To scratch in kindness (*Shakspeare*). 5. *To* CURRY *favour.* To become a favourite by petty officiousness, slight kindnesses, or flattery (*Hoo.*).

CU'RRYCOMB. *s.* An instrument used for currying horses (*Locke*).

CURRYING is the art of dressing cow-hides, calves-skins, seal-skins, &c., principally for shoes; and this is done either upon the flesh or the grain.

In dressing leather for shoes upon the flesh, the first operation is soaking the leather in water, until it is thoroughly wet; then the flesh side is shaved on a beam about seven or eight inches broad, with a knife of a peculiar construction, to a proper substance, according to the custom of the country, and the uses to which it is to be applied. This is one of the most curious and laborious operations in the whole mystery of currying. The knife used for this purpose is of a rectangular form, with two handles, one at each end, and a double edge. They are manufactured at Cirencester, and composed of iron and steel: the edge is given to them by rubbing them on a flat stone of a sharp gritty substance till it comes to a kind of wire; this wire is taken off by a fine stone, and the edge is then turned to a kind of groove wire by a piece of steel in form of a bodkin, which steel is used to renew the edge in the operation.

After the leather is properly shaved, it is thrown into the water again, and scowered upon a board or stone commonly appropriated to that use. Scowering is performed by rubbing the grain or hair side with a piece of pumice-stone, or with some other stone of a good grit, not unlike in thickness and shape to the slate with which some houses are covered. These stones force out of the leather a white sort of substance, called the bloom, produced by the oak bark in tanning. The hide or skin is then conveyed to the shade or drying place, where the oily substances are applied, termed stuffing or dubbing. The oil used for this purpose is prepared by the oil leather-dressers, by boiling sheep skins or doe skins in cod oil. This is put on both sides of the leather, but in greater and thicker quantity on the flesh than on the grain or hair side.

Thus we have pursued the currying of leather in its wet state, and through its first stage, commonly called getting out.

When it is thoroughly dry, an instrument, with teeth on the under side, called a graining-board, is first applied to the flesh-side, which is called graining; then to the grain-side, called bruising. The whole of this operation is intended to soften the leather to which it is applied. Whitening, or pairing, succeeds, which is performed with a fine edge to the knife already described, and used in taking off the grease from the flesh. It is then boarded up, or grained again, by applying the graining-board first to the grain and then to the flesh.

It is now fit for waxing, which is performed first by colouring. This is performed by rubbing with a brush, dipped in a composition of oil and lamp black, on the flesh till it be thoroughly black: it is then sized, called black sizing, with a brush or spunge, dried, tallowed with a woollen cloth, and slicked upon the flesh with a small smooth piece of glass; sized again with a sponge; and when dry, this sort of leather, called waxed, or black on the flesh, is curried.

Currying leather on the hair or grain side, called black on the grain, is the same in the first operation with that dressed on the flesh, till it is scowered. Then the first black is applied to it while wet; which black is a solution of the sulphate of iron, called copperas, in fair water, or in the water in which the skins as they come from the tanner have been soaked: this is first put upon the grain after it has been rubbed with a stone: then rubbed over with a brush dipped in stale urine; slicked out with an iron slicker, in order to make the grain come out as fine as possible, and then stuffed in the manner already described among the first operations of currying; and when dry it is seasoned, i. e. rubbed over with a brush dipped in copperas-water on the grain till it is perfectly black; then slicked with a stone of a good grit, to take out the wrinkles as much as possible: after this the grain is raised with a fine graining-board, by turning the skin or piece of leather in various directions; and when a little dried, it is bruised, in order to soften it. When it is thoroughly dry it is whitened, bruised again, and grained in two or three different ways, and when oiled upon the grain with a mixture of oil and tallow it is finished.

Bull and cow hides are sometimes curried for the use of sadlers and collar-makers; but the principal operations are much the same as those we have already described. It should, however, be observed, that only a small portion of flesh is taken off from hides designed for these purposes. Hides for the roofs of coaches, &c. are shaved nearly as thin as shoe hides, and blacked on the grain side.

The oil used in the first operation of stuffing, or dubbing, is called spent oil, and contains a portion of alkali. It has latterly been made up expressly for the curriers. A fact worthy of remark is, that it is imbibed more uniformly and effectually by wet than by dry leather; and this no doubt arises from the gradual evaporation of the water, which gives place to the introduction of the oil by capillary attraction, whereas the air, if interspersed in the pores, would resist it. For M. St. Real's Observations on Currying, see Repertory of Arts, vol. ii. p. 347.

To CURSE. *v. a.* (cuꞃꞅian, Saxon.) 1. To wish evil; to execrate (*Knolles*). 2. To mischief; to afflict (*Pope*).

To Curse. *v. n.* To imprecate (*Judges*).

Curse. *s.* (from the verb.) 1. Malediction; wish of evil to another (*Dryden*). 2. Affliction; torment; vexation (*Addison*).

CU'RSED. *particip. a.* 1. Deserving a curse; hateful; detestable; abominable; wicked (*Shakspeare*). 2. Unholy; unsanctified (*Milt.*). 3. Vexatious; troublesome (*Pri.*).

CU'RSEDLY. *ad.* Miserably; shamefully (*Pope*).

CU'RSEDNESS. *s.* (from *cursed.*) The state of being under a curse.

CU'RSHIP. *s.* (from *cur.*) Dogship; meanness; scoundrelship (*Hudibras*).

CURSITOR, a clerk belonging to the court of chancery, whose business it is to make out original writs. In the statute 18 Edward III. they are called clerks of course, and are twenty-four in number, making a corporation of themselves. To each of them is allowed a division of certain counties, into which they issue out the original writs required by the subject.

Cursitor-baron, an officer in the court of exchequer, who administers the oaths of all high-sheriffs, bailiffs, auditors, receivers, collectors, comptrollers, surveyors, and searchers of all the customs in England.

CURSOR, a small piece of brass, &c. that slides; as, the piece in an equinoctial ring dial that slides to the day of the month; or the little ruler or label of brass sliding in a groove along the middle of another label, representing the horizon in the analemma; or the point that slides along the beam compass, &c.

CU'RSORARY. *a.* (from *cursus*, Latin.) Cursory; hasty; careless (*Shakspeare*).

CU'RSORILY. *ad.* (from *cursory.*) Hastily; without care (*Atterbury*).

CU'RSORINESS. *s.* (from *cursory.*) Slight attention.

CU'RSORY. *a.* (from *cursorius*, Latin.) Hasty; quick; inattentive; careless (*Addison*).

CURST. *a.* Froward; peevish; malignant; mischievous; malicious; snarling (*Crashaw*).

CU'RSTNESS. *s.* (from *curst.*) Peevishness; frowardness; malignity (*Dryden*).

CURT. *a.* (from *curtus*, Latin.) Short.

To CU'RTAIL. *v. a.* (*curto*, Latin.) To cut off; to cut short; to shorten (*Hudibras*).

Cu'rtail dog. *s.* A dog whose tail is cut off (*Shakspeare*).

Curtail, or Cur-tail, in the manage, a name given to the tail of a horse after he has undergone the operation of docking. See Docking.

CU'RTAIN. *s.* (*cortina*, Latin.) 1. A cloth contracted or expanded at pleasure (*Arbuthnot*). 2. *To draw the* Curtain. To close it, so as to conceal the object; or to open, so as to discern the object (*Pope. Shakspeare*). 3. (In fortification.) The part of the wall or rampart that lies between two bastions. See Curtin.

Cu'rtain-lecture. *s.* (from *curtain* and *lecture.*) A reproof given by a wife to her husband in bed (*Addison*).

To Cu'rtain. *v. n.* (from the noun.) To enclose or accommodate with curtains (*Pope*).

CURTATE DISTANCE, in astronomy, the distance from the sun to that point where a perpendicular let fall from a planet or comet meets the plane of the ecliptic.

CURTATION, in astronomy, the difference between a body's distance from the sun, and its curtate distance.

CURTELASSE. See Cutlass.

CURTEYN, Curtana, in the British customs, king Edward the Confessor's sword, borne before the prince at coronations. Its point is said to be broken off, as an emblem of mercy.

CURTIN, Curtain, or Courtin, in fortification, is that part of the rampart of a

place which is betwixt the flanks of two bastions bordered with a parapet five feet high, behind which the soldiers stand to fire upon the covered way and into the moat. As it is the best defended of any part of the rampart, besiegers never carry on their attacks against the curtain, but against the faces of the bastions, because of their being defended only by one flank.

CURTISIA. In botany, a genus of the class tetrandria, order monogynia. Calyx four-parted; petals four; drupe superior, roundish, succulent, with a four, or five-celled nut. One species only; a large tree of the Cape, with terminal panicle.

CURTIUS (Quintus), a Latin historian, who wrote the life of Alexander the Great in ten books, of which the two first are not indeed extant, but are so well supplied by Freinshemius, that the loss is scarcely regretted. Where this writer was born, or even when he lived, are points no one pretends to know. By his style he is supposed to have lived in or near the Augustan age; while some are not wanting, who imagine the work to have been composed in Italy about 300 years ago, and the name of Quintus Curtius to be fictitiously added to it. Cardinal du Perron was so great an admirer of this work, as to declare one page of it to be worth thirty of Tacitus; yet M. le Clerc, at the end of his Art of Criticism, has charged the writer with great ignorance, and many contradictions. He has nevertheless many qualities as a writer, which will always make him admired and applauded. The Elzevir edition of Curtius's History, as well as the Delphin editions of 1678 and 1724, and the Variorum of 1708, are highly regarded by critics.

CU'RTSY. See COURTESY.

CU'RVATED. *a.* (*curvatus,* Lat.) Bent.

CURVA'TION. *s.* (*curvo,* Lat.) The act of bending or crooking.

CURVATOR COCCYGIS, in anatomy, a name given by Albinus to a muscle of the coccyx discovered by himself, and not described by any other author. It is an oblong, thin, and small muscle, and for the most part tendinous. It arises with a double head, one from the inner, and the other from the lower and lateral part of the os sacrum; and descending, terminates in three extremities. He calls it the curvator coccygis, from its office, which is the bending the coccyx; and says, that he found it in different states, in three subjects: one very perfect and entire; in a second, more imperfect and degenerating; and in the third, resembling a ligament rather than a muscle.

CURVATURE OF A LINE, is its bending or flexure; by which it becomes a curve, of any peculiar form and properties. Thus, the nature of the curvature of a circle is such, as that every point in the periphery is equally distant from a point within, called the centre; and so the curvature of the same circle is every where the same; but the curvature in all other curves is continually varying.—The curvature of a circle is so much the more, as its radius is less, being always reciprocally as the radius; and the curvature of other curves is measured by the reciprocal of the radius of a circle having the same degree of curvature as any curve has, at some certain point.

Every curve is bent from its tangent by its curvature, the measure of which is the same as that of the angle of contact formed by the curve and tangent. Now the same tangent is common to an infinite number of circles, or other curves, all touching it and each other in the same point of contact. So that any curve may be touched by an infinite number of different circles at the same point: and some of these circles fall wholly within it, being more curved, or having a greater curvature than that curve; while others fall without it near the point of contact, or between the curve and tangent at that point, and so, being less deflected from the tangent than the curve is, they have a less degree of curvature there. Consequently there is one, of this infinite number of circles, which neither falls below it nor above it, but, being equally deflected from the tangent, coincides with it most intimately of all the circles; and the radius of this circle is called the radius of curvature of the curve; also the circle itself is called the circle of curvature, or the osculatory circle of that curve, because it touches it so closely that no other circle can be drawn between it and the curve.

To determine the Radius and Circle of Curvature by the Method of Fluxions.

Let AE*e* be any curve (Pl. 50. fig. 3.), concave towards its axis AD; draw an ordinate DE to the point E where the curve is required to be found; and suppose EC perpendicular to the curve, and equal to the radius of the circle BE*e* of curvature sought; lastly, draw E*d* parallel to AD, and *de* parallel and indefinitely near to DE; thereby making E*d* the fluxion or increment of the absciss AD, also *de* the fluxion of the ordinate DE, and E*e* that of the curve AE. Now put $x=\mathrm{AD}$, $y=\mathrm{DE}$, $z=\mathrm{AE}$, and $r=\mathrm{CE}$ the radius of curvature; then is $\mathrm{E}d=\dot{x}$, $de=\dot{y}$, and $\mathrm{E}e=\dot{z}$.

Now, by sim. tri. the 3 lines - E*d*, *de*, E*e*,
or - $\dot{x}$, $\dot{y}$, $\dot{z}$,
are respectively as the three - GE, GC, CE;
therefore - - - $\mathrm{GC}\,.\,\dot{x}=\mathrm{GE}\,\dot{y}$;
and the flux. of this equa. is

$$\mathrm{GC}\,.\,\ddot{x}+\dot{\mathrm{GC}}\,.\,\dot{x}=\mathrm{GE}\,.\,\ddot{y}+\dot{\mathrm{GE}}\,\dot{y},$$

or because $\dot{\mathrm{GC}}=-\dot{\mathrm{BG}}$, it is

$$\mathrm{GC}\,.\,\ddot{x}-\dot{\mathrm{BG}}\,.\,\dot{x}=\mathrm{GE}\,.\,\ddot{y}+\dot{\mathrm{GE}}\,.\,\dot{y}.$$

But, since the two curves AE and BE have the same curvature at the point E, their abscisses and ordinates have the same fluxions at that point, that is E*d* or $\dot{x}$ is the fluxion both of AD and BG, and *de* or $\dot{y}$ is the fluxion both of DE and GE. In the above equation therefore substitute $\dot{x}$ for $\dot{\mathrm{BG}}$, and $\dot{y}$ for $\dot{\mathrm{GE}}$, and it

becomes - $\mathrm{GC}\,.\,\ddot{x}-\dot{x}\dot{x}=\mathrm{GE}\,.\,\ddot{y}+\dot{y}\dot{y}$,
or - $\mathrm{GC}\,.\,\ddot{x}-\mathrm{GE}\,.\,\ddot{y}=\dot{x}^2+\dot{y}^2$ or $\dot{z}^2$.

Now mult. the three terms of this equation respectively by these three quantities,

$\frac{\dot{y}}{\mathrm{GC}}, \frac{\dot{x}}{\mathrm{GE}}, \frac{\dot{z}}{\mathrm{CE}}$, which are equal, and it becomes

$\dot{y}\ddot{x}-\dot{x}\ddot{y}=\frac{\dot{z}^3}{\mathrm{CE}}$, or $\frac{\dot{z}^3}{r}$; and hence $r=\frac{\dot{z}^3}{\dot{y}\ddot{x}-\dot{x}\ddot{y}}$,

which is the general value of the radius of curvature for all curves whatever, in terms of the fluxions of the absciss and ordinate.

Farther, as in any case either x or y may be supposed to flow equably, that is, either $\dot{x}$ or $\dot{y}$ constant quantities, or $\ddot{x}$ or $\ddot{y}$ = to nothing, by this

Absciss.

Fig. 1.

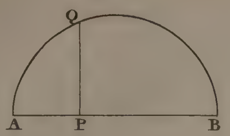


Fig. 2.

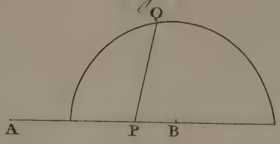
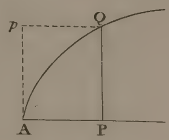
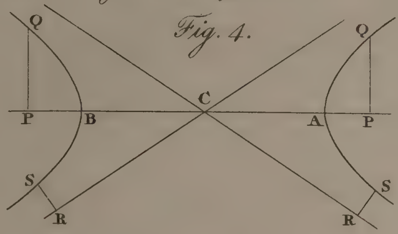


Fig. 3.



Absciss of Hyperbola.

Fig. 4.



Asymptote.

Fig. 5.

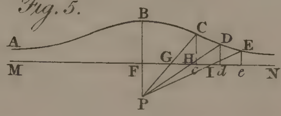
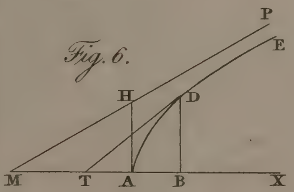


Fig. 6.



Biquadratic Parabolas.

Fig. 7.

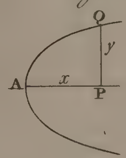


Fig. 8.

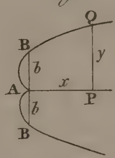
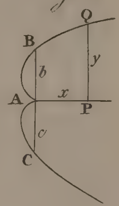
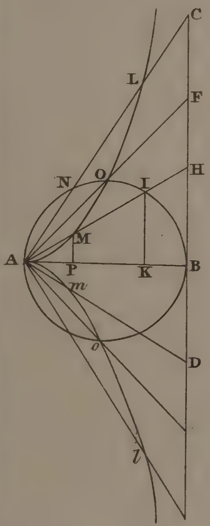


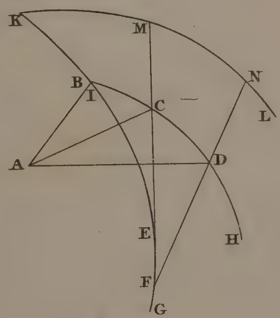
Fig. 9.



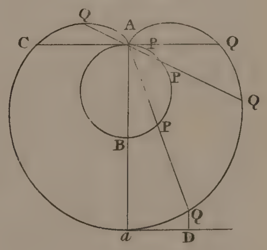
Cissoid.



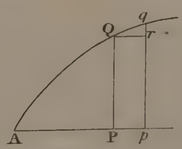
Catacaustic.



Cardioide.



Characteristic Triangle.



Mutlow Sc. Russell Ct.

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supposition either of the terms in the denominator of the value of r may be made to vanish. So that when $\dot{x}$ is constant, the value of r is $\frac{\dot{z}^3}{-\dot{x}\ddot{y}}$, but r is $= \frac{\dot{z}^3}{\dot{y}\ddot{x}}$ when $\dot{y}$ is constant.

For example, suppose it were required to find the radius or circle of curvature to any point of a parabola, its vertex being A, and axis AD.—Now the equation of the curve is $ax=y^2$ hence $a\dot{x}=2y\dot{y}$, and $a\ddot{x}=2\dot{y}^2$, supposing $\dot{y}$ constant, also $a^2x^2=4y^2\dot{y}^2$; hence r or

$$\frac{\dot{z}^3}{\dot{y}\ddot{x}} \text{ or } \frac{\left.\overline{\dot{x}^2+\dot{y}^2}\right|^{\frac{3}{2}}}{\dot{y}\ddot{x}} \text{ is } \frac{\left.\overline{a^2+4y^2}\right|^{\frac{3}{2}}}{2a^2} \text{ or } \frac{\left.\overline{a+4x}\right|^{\frac{3}{2}}}{2\sqrt{a}},$$

the general value of the radius of curvature for any point E, the ordinate to which cuts off the absciss AD $=x$.

Hence, when x or the absciss is nothing, the last expression becomes barely $\frac{a^{\frac{3}{2}}}{2\sqrt{a}} = \frac{1}{2}a = x$, for the radius of curvature at the vertex of a parabola; that is, the diameter of the circle of curvature at the vertex of a parabola, is equal to a, the parameter of the axis.

For other valuable particulars relating to curvature, the radii of curvature, &c. see Maclaurin's Algebra, Maclaurin's Fluxions, Simpson's Fluxions, Stone's Fluxions, Euler's Analysis Infinitorum, &c. See also the article CENTRAL FORCES in this work, for simple methods of determining the radii of curvature to the conic sections.

CURVATURE (Double), is a term used to denote the curvature of a line, all the parts of which are not situated in the same plane.

A curve which can only be traced upon a curve surface, and not upon a plane surface, is called a curve of double curvature. These kinds of curves may be considered as generated by the track of a point which is moved upon a curve surface, the direction of its motion being continually deflected either towards the right or towards the left hand; thus it happens that the line so described is curved in two senses; for, in effect, it partakes of the curvature of the curve surfaces, and of the continual and successive deflections of the describing point.

Two curve surfaces which mutually penetrate each other, form also, in general, by their intersection, a curve of double curvature. Such, for example, is the curve which is formed by the mutual penetration of a right cylinder and a sphere, supposing that the axis of the cylinder does not pass through the centre of the sphere. We have said, in general, for it may happen, on account of particular circumstances, that the intersections of two curve surfaces is a plane curve. Thus, in the preceding example, if the axis of the cylinder passed through the centre of the sphere, the curve of intersection would be the common circle. Ingenious disquisitions on curves of double curvature have been given by Euler, Cramer, Bossut, and Lacroix.

CURVE, in geometry, a line whose several parts proceed in different directions, and are successively posited towards different points in space, which also may be cut by one right line in two or more points.

If all the points in the curve may be included in one plane, the curve is called a plane curve; but if they cannot all be comprised in one plane, then is the curve one of double curvature.

Since the word direction implies straight lines, and in strictness no part of a curve is a right line, some geometers prefer defining curves otherwise: thus, in a straight line to be called the line of the abscissas, from a certain point let a line arbitrarily taken be called the abscissa, and denoted (commonly) by x: at the several points corresponding to the different values of x, let straight lines be continually drawn, making a certain angle with the line of the abscissas: these straight lines being regulated in length according to a certain law or equation, are called ordinates; and the line or figure in which their extremities are continually found is, in general, a curve line. This definition, however, is not free from objection; for a right line may be denoted by an equation between its abscissas and ordinates, such as $y=ax+b$.

The doctrine of curves, and of the planes and solids generated from them, constitute what is called the higher geometry.

CURVE LINES are distinguished into algebraical or geometrical, and transcendental or mechanical.

CURVES (Algebraical or geometrical), are those in which the relation of the abscisses to the ordinates can be expressed by a common algebraical expression.

And Transcendental or Mechanical CURVES, are such as cannot be so defined or expressed by an algebraical equation; or when they are expressed by an equation, one of whose terms is a variable quantity, or a curve line. See TRANSCENDENTAL. Thus, $y=\log. x$, $y=\text{As in. } x$, $y=\text{A cos. } x$, $y=\text{A}^x$, &c.

The doctrine of curve lines in general, as denoted by algebraical equations, was first introduced by Des Cartes, who called algebraical curves geometrical ones; admitting none else into the construction of problems. But Newton, and after him, Leibnitz and Wolfius, are of another opinion; they think that in the construction of a problem one curve is not to be preferred to another, for its being defined by a more simple equation, but for its being more easily described.

The point of view which first presents itself, and which appears the most favourable for the division of curve lines into different classes, is to consider the representative algebraic functions, under the relation of their multiformity. Hence it would follow, that those curves which spring from uniform functions would be referred to the first kind; those which arise from biform functions, would be of the second kind; those resulting from triform functions, of the third kind, and so on.

But though this division appears natural, yet on a closer examination it will not be found conformable to the nature and character of curve lines. For the multiformity of functions depends principally on the position of the axis, which is arbitrary; so that if for one axis the ordinate is a uniform function of the abscissa, it may, merely by changing the axis, become a multiform function; whence it would follow that the same curve might be found to appertain to different species, which would not fulfil the object of the classification. Thus, for example, the curve denoted by the equation $a^3y=a^2x^2-x^4$, would belong to the first kind, because the ordinate y is a uniform function of x; but, by changing the coordinates, or by assuming an axis perpendicular

to the former, the same curve will be represented by the equation $y^4 - a^2x^2 + a^3x = 0$, and will consequently belong to the fourth kind. We cannot therefore admit the multiformity of functions to furnish a distinctive characteristic of the different classes of curves.

Nor is the simplicity of the equations which express the nature of curves, with regard to the number of terms, able to furnish a sufficient distinction. Thus, if we refer to the first kind, those whose equation is composed of two terms, as $y^m - ax^n$; to the second, those whose equation consists of three terms, as $\alpha y^m + \beta y^p x^q + \gamma x^n = 0$, and so on: then it is clear that the same line might still appertain to several kinds. For the curve which is represented by the equation $y^2 - ax = 0$, must be referred at the same time both to the first and to the fourth kind; because by merely changing the axis, the equation to the curve would become

$$16\,u^2 - 24\,tu + 9\,t^2 - 55\,au + 10at = 0.$$

We may avoid these inconveniences by classing curves according to the orders of the equations which express the relation between the co-ordinates. For, the equation for the same curve, remaining always of the same order so long as each of the assumed systems of co-ordinates is supposed to retain constantly the same inclination of ordinate to abscissa, while referred to different points of the curve, however the axis and the origin of the abscissas, or even the inclination of the co-ordinates in different systems may vary; the same curve will never be ranked under different orders, according to this method. If, therefore, we take for a distinctive character the number of dimensions which the co-ordinates whether rectangular or oblique form in the equation, we shall not disturb the order of the classes, by changing the axis and the origin of the abscissas, or by varying the inclination of the co-ordinates.

As algebraists call orders of different kinds of equations, those which constitute the greater or less number of dimensions, we distinguish by the same name the different kinds of resulting lines. Consequently the general equation of the first order being

$$0 = \alpha + \beta x + \gamma y;$$

we may refer to the first order all the lines, which by taking x and y for the co-ordinates whether rectangular or oblique, give rise to this equation. But it is known that this equation comprises the right line alone, which is the most simple of all lines; and since for this reason the name of curve does not properly apply to the first order, we do not usually distinguish the different orders by the name of curve lines, but simply by the generic term of lines: hence the first order of lines does not comprehend any curves, but solely the right line.

As for the rest, it is indifferent whether the co-ordinates are perpendicular or not; for if the ordinates make with the axis an angle φ whose sine is μ and cosine ν, we can refer the equation to that of the rectangular co-ordinates, by making $y = \frac{u}{\mu}$, and $x = \frac{\nu u}{\mu} + t$; which will give for an equation between the perpendiculars t and u,

$$0 = \alpha + \beta t + \left(\frac{\beta\nu}{\mu} + \frac{\gamma}{\mu}\right)u.$$

Thus it follows evidently, that the signification of the equation is not limited by supposing the ordinates to be rightly applied: and it will be the same with equations of superior orders, which will not be less general though the co-ordinates are perpendicular. Hence, since the determination of the inclination of the ordinates applied to the axis, takes nothing from the generality of a general equation of any order whatever, we put no restriction upon its signification by supposing the co-ordinates rectangular; and the equation will be of the same order whether the co-ordinates be rectangular or oblique.

All the lines of the second order will be comprised in the general equation

$$0 = \alpha + \beta x + \gamma y + \delta x^2 + \epsilon xy + \zeta y^2;$$

that is to say, we may class among lines of the second order all the curve lines which this equation expresses, x and y denoting the rectangular co-ordinates. These curve lines are, therefore, the most simple of all, since there are no curves in the first order of lines; it is for this reason that some writers call them curves of the first order. But the curves included in this equation are better known under the name of CONIC SECTIONS, because they all result from sections of the cone. The different kinds of these lines are the circle, the ellipse, the parabola, and the hyperbola; the properties of all which may be deduced with facility from the preceding general equation. See CONIC SECTIONS.

We class under lines of the third order all the curves which may be expressed by the general equation

$$0 = \alpha + \beta x + \gamma y + \delta x^2 + \epsilon xy + \zeta y^2 + \eta x^3 + \theta x^2 y + \iota xy^2 + \kappa y^3.$$

And in like manner we regard as lines of the fourth, those curves which are furnished by the general equation

$$0 = \alpha + \beta x + \gamma y + \delta x^2 + \epsilon xy + \zeta y^2 + \eta x^3 + \theta x^2 y + \iota xy^2 + \kappa y^3 + \lambda x^4 + \mu x^3 y + \nu x^2 y^2 + \xi xy^3 + o y^4;$$

taking always x and y for rectangular co-ordinates. In the equation of the third order there are 10 constant quantities, and in that of the fourth order 15, which may be determined at pleasure; whence it results that the kinds of lines of the third order, and, much more, those of the fourth order, are considerably more numerous than those of the second.

It will now be easy to conceive, from what has gone before, what are the curve lines that appertain to the fifth, sixth, seventh, or any higher order; but as it is necessary to add to the general equation of the fourth order, the terms

$$x^5,\ x^4y,\ x^3y^2,\ x^2y^3,\ xy^4,\ y^5,$$

with their respective constant coefficients, to have the general equation comprizing all the lines of the fifth order, this latter will be composed of 21 terms: and the general equation comprehending all the lines of the sixth order, will have 28 terms; and so on, conformably to the law of the triangular numbers. Thus the general equation for lines of the order n, will contain $\frac{(n+1)}{1} \cdot \frac{(n+2)}{2}$ terms, and as many constant letters, which may be determined at pleasure.

Since the order of the proposed equation between the co-ordinates, makes known that of the curve line; whenever we have given an algebraic equation between the co-ordinates x and y, or t and u, we know at once to what order it is necessary to refer the curve represented by that equation. If the equation be irrational it must be freed from radicals, and if there be fractions they must be made to disappear; this done, the greatest number of dimensions formed by the

variable quantities x and y, will indicate the order to which the line belongs. Thus, the curve which is denoted by this equation $y^2-ax=0$, will be of the second order, or of the first order of curves; while the curve represented by the equation $y^2=x\sqrt{a^2-x^2}$, will be of the third order (that is, the fourth order of lines), because the equation is of the fourth order when freed from radicals; and the line which is indicated by the equation $y=\frac{a^3-ax^2}{a^2+x^2}$, will be of the third order or of the second order of curves, because the equation when the fraction is made to disappear becomes $a^2y+x^2y=a^3-ax^2$, where the term x^2y contains three dimensions.

It is possible that one and the same equation may give different curves, according as the applicates or ordinates fall upon the axis perpendicularly or under a given obliquity. For instance, this equation, $y^2=ax-x^2$, gives a circle, when the co-ordinates are supposed perpendicular; but when the co-ordinates are oblique, the curve represented by the same equation will be an ellipse. Yet all these different curves appertain to the same order, because the transformation of rectangular into oblique co-ordinates, and the contrary, does not affect the order of the curve or of its equation. Hence, though the magnitude of the angles which the ordinates form with the axis, neither augment nor diminish the generality of the equation, which expresses the lines of each order; yet, a particular equation being given, the curve which it expresses can only be determined when the angle between the co-ordinates is determined likewise.

That a curve line may relate properly to the order indicated by the equation, it is requisite that this equation be not decomposable into rational factors; for if it could be composed of two or of more such factors, it would then comprehend as many equations, each of which would generate a particular line, and the re-union of these lines would be all that the equation proposed could represent. Those equations, then, which may be decomposed into such factors, do not comprize one continued curve, but several at once, each of which may be expressed by a particular equation; and such combinations of separate curves are denoted by the term complex curves.

Thus, the equation $y^2=ay+xy-ax$, which seems to appertain to a line of the second order, if it be reduced to zero by making $y^2-ay-xy+ax=0$, will be composed of the factors $(y-x)(y-a)=0$; it therefore comprises the two equations $y-x=0$, and $y-a=0$, both of which belong to the right line: the first forms with the axis at the origin of the abscissas an angle equal to half a right angle; and the second is parallel to the axis, and drawn at a distance $=a$. These two lines considered together are comprised in the proposed equation $y^2=ay+xy-ax$. In like manner we may regard as complex this equation, $y^4-xy^3-a^2x^2-ay^3+ax^2y+a^2xy=0$; for its factors being $(y-x)(y-a)(y^2-ax)=0$, instead of denoting one continued line of the fourth order, it comprises three distinct lines, viz. two right lines, and one curve denoted by the equation $y^2-ax=0$.

We may, therefore, form at pleasure any complex lines whatever, which shall contain two or more right lines or curves. For, if the nature of each line is expressed by an equation referred to the same axis and to the same origin of the abscissas, and after having reduced each equation to zero, we multiply them one by another, there will result a complex equation which at once comprises all the lines assumed. For example, if from the centre C (fig. 4, Pl. 50.), with a radius $CA=a$, a circle be described, and farther if a right line LN be drawn through the centre C; then we may, for any assumed axis, find an equation which will at once include the circle and the right line, as though these two lines formed only one.

Suppose there be taken for an axis the diameter AB that forms with the right line LN an angle equal to half a right angle: having placed the origin of the abscissas in A make the abscissa $AP=x$, and the applicate or ordinate $PM=y$; we shall have for the right line, $PM=CP=a-x$; and since the point M of the right line falls on the side of those ordinates which are reckoned negative, we have $y=-a+x$, or $y-x+a=0$: but, for the circle, we have $PM^2=AP.PB$, and $BP=2a-x$, which gives $y^2=2ax-x^2$, or $y^2+x^2-2ax=0$. Multiplying these two equations together we obtain the complex equation of the third order,

$$y^3-y^2x+yx^2-x^3+ay^2-2axy+3ax^2-2a^2x=0,$$

which represents, at once, the circle and the right line. Hence, we shall find that to the abscissa $AP=x$, corresponds three ordinates, namely, two for the circle, and one for the right line. Let, for example, $x=\frac{1}{2}a$, the equation will become $y^3+\frac{1}{2}ay^2-\frac{3}{4}a^2y-\frac{3}{8}a^3=0$; whence we first find $y+\frac{1}{2}a=0$, and by dividing by this root, we obtain $y^2-\frac{3}{4}a^2=0$, the two roots of which being taken and ranked with the former, give the three following values of y:

I. $y=-\frac{1}{2}a$.
II. $y=\frac{1}{2}a\sqrt{3}$.
III. $y=-\frac{1}{2}a\sqrt{3}$.

We see, therefore, that the whole is represented by one equation, as if the circle together with the right line formed only one continued curve.

This difference between simple and complex curves being once established, it is manifest that the lines of the second order are either continued curves, or complex lines formed of two right lines; for if the general equation have rational factors, they must be of the first order, and consequently will denote right lines. Lines of the third order will be either simple, or complex, formed either of a right line and a line of the second order, or of three right lines. In like manner, lines of the fourth order will be continued and simple, or complex, comprizing a right line and a line of the third order, or two lines of the second order, or lastly, four right lines. Complex lines of the fifth and superior orders will be susceptible of an analogous combination, and of a similar enumeration. Hence it follows, that any order whatever of lines may comprize, at once, all the lines of inferior order, that is to say, that they may contain a complex line of any inferior orders with one or more right lines, or with lines of the second, third, &c. order; so that if we sum the numbers of each order, appertaining to the simple lines, there will result the number indicating the order of the complex line.

Every curve line may be considered as the track described by a point moving according to any law whatever: and the expression of that law or of the conditions to which the motion of the point is subjected, constitutes that which is called the equation of the curve. This equation is ge-

nerally exhibited in functions of some variable abscissa, and its corresponding ordinate either rightly or obliquely applied: but an equation may also be established between other variable quantities, changing with the generating point, and from any such equation different properties of the curve may be deduced. Now the principal variable quantities corresponding to the describing point of a curve, besides the abscissa and ordinate, are the radius vector, the angle formed by that radius and the axis of the abscissas, the angle formed by the tangent and the applicates or ordinates, the sub-tangent, the normal, the radius of curvature, &c. And since the examination of the mutual relations of some of these variable quantities will often be useful in the doctrine of curves, we shall enter a little into detail on this head. Let, therefore, M (fig. 6, Pl. 50.) be the generating point of any curve whatever, in any assumed part of its progress, A the origin of the co-ordinates, AP the abscissa, PM the ordinate rightly applied, AM the radius vector, and MAP the angle formed by that radius vector and the axis; MT the tangent, TP the sub-tangent, AQ the perpendicular let fall from the origin of the abscissas upon the tangent; MN the normal, PN the sub-normal, MR the radius of curvature. Taking, moreover, at pleasure, a point B upon that axis, and forming the triangle MAB, also demitting upon the several sides of that triangle perpendiculars from the opposite angles. Then, it is obvious that as the describing point M changes its position, the right lines MA, MB, MT, MN, MP, AQ, MR, &c. as well as their segments AK, MK, BK, &c. and the angles MAB, AMB, AKB, &c. will change their values. But it is nevertheless possible when the values of some of these quantities are known, to find corresponding values of the others, and thus to make considerable mutations in the representative equations of curves. To this end, let the variable abscissa AP $=x$, the ordinate rightly applied PM $=y$, the distance AB from the origin of the abscissas to the point B taken arbitrarily $=a$, and leaving to each of the other variable quantities their designation indicated by the letters of the figure, the values of the chief of them expressed in terms of x, y, and a, are exhibited in the following

TABLE.

I. *Values of the tangents of Angles.*

1. tan. AMP $=\frac{x}{y}$.
2. tan. BMP $=\frac{a-x}{y}$.
3. tan. AMB $=\frac{ay}{y^2-x\,(a-x)}$.
4. tan. BAK $=\frac{a-x}{y}$.
5. tan. MAK $=\frac{y^2-x\,(a-x)}{ay}$.
6. tan. MAB $=\frac{y}{x}$.
7. tan. ABK $=\frac{x}{y}$.
8. tan. MBK $=\frac{y^2-x\,(a-x)}{ay}$.
9. tan. MBA $=\frac{y}{a-x}$.
10. tan. AKP $=\frac{y}{a-x}$.
11. tan. BKP $=\frac{y}{x}$.
12. tan. AKB $=\frac{ay}{x(a-x)-y^2}$.
13. tan. MTP $=\frac{\dot{y}}{\dot{x}}$.
14. tan. TMA $=\frac{y\dot{x}-x\dot{v}}{x\dot{x}+y\dot{y}}$.

II. *Values of Lines.*

15. AB $=a$.
16. AP $=x$.
17. MP $=y$.
18. BP $=a-x$.
19. KP $=\frac{x\,(a-x)}{y}$.
20. KG $=\frac{x\,(y^2-x\,.\,\overline{a-x})}{y\sqrt{x^2+y^2}}$.
21. KH $=\frac{(a-x)\,(y^2-x\,.\,\overline{a-x})}{y\sqrt{(a-x)^2+y^2}}$.
22. AM $=\sqrt{x^2+y^2}$.
23. BM $=\sqrt{(a-x)^2+y^2}$.
24. AH $=\frac{ay}{\sqrt{(a-x)^2+y^2}}$.
25. BG $=\frac{ay}{\sqrt{x^2+y^2}}$.
26. MK $=\frac{y^2-x\,(a-x)}{y}$.
27. AK $=\frac{x}{y}\sqrt{y^2+(a-x)^2}$.
28. BK $=\frac{a-x}{y}\sqrt{y^2+x^2}$.
29. MG $=\frac{y^2-x\,(a-x)}{\sqrt{x^2+y^2}}$.
30. AG $=\frac{ax}{\sqrt{x^2+y^2}}$.
31. MH $=\frac{y^2-x\,(a-x)}{\sqrt{(a-x)^2+y^2}}$.
32. BH $=\frac{a\,(a-x)}{\sqrt{(a-x)^2+y^2}}$.
33. GH $=\frac{a\,(y-x\,.\,\overline{a-x})}{\sqrt{(x^2+y^2)\,(\overline{a-x}^2+y^2)}}$.
34. GP $=\sqrt{\frac{y^2+(a-x)^2}{x^2+y^2}}$.
35. HP $=(a-x)\sqrt{\frac{x^2+y^2}{y^2+(a-x)^2}}$.
36. TP $=\frac{y\dot{x}}{\dot{y}}$.
37. TQ $=\frac{x\dot{x}\dot{y}-y\dot{x}^2}{\sqrt{\dot{x}^2+\dot{y}^2}}$.
38. PN $=\frac{y\dot{v}}{\dot{x}}$.
39. MT $=y\sqrt{\frac{\dot{x}^2}{\dot{y}^2}+1}$.
40. AQ $=\frac{x\dot{y}-y\dot{x}}{\sqrt{\dot{x}^2+\dot{y}^2}}$.

41. $MN = y\sqrt{1+\frac{\dot{y}^2}{\dot{x}^2}}$.

42. $MR = -\dot{y} \div \left(\frac{\dot{x}}{\sqrt{\dot{x}^2+\dot{y}^2}}\right)$.

III. *Values of Areas.*

43. $AMB = \frac{1}{2}ay$.

44. $AMP = \frac{1}{2}xy$.

45. $BMP = \frac{1}{2}y\,(a-x)$.

46. $AKB = \frac{ax(a-x)}{2y}$

47. $AKP = \frac{x^2(a-x)}{2y}$.

48. $BKP = \frac{x(a-x)^2}{2y}$.

49. $AMK = \frac{x(y^2-x\,.\,\overline{a-x})}{2y}$

50. $BMK = \frac{1}{2}a(a-x)$.

It will now be easy to see in what manner it will be possible to change in almost an infinity of ways, the system of co-ordinates. For, if instead of the co-ordinates x, y, we wish to take any two others whatever chosen from among the fifty variable quantities in the above table, we shall only have to search in the table for those new co-ordinates expressed in the terms of x, y, and the constant qantity a: from these two formulæ we may deduce reciprocally x, and y in values of the new co-ordinates, and may substitute these values in all the other formulæ. The same thing would obtain, if, instead of any two of these variable quantities, we were to take for co-ordinates, any functions of the same quantities combined two by two, three by three, &c. Similar remarks will apply to the transforming the equations of curves, &c. But instead of multiplying observations, we may propose an example or two.

Prob. I. The equation of a curve AMB being given, between the abscissa AP and the ordinate PM (fig. 6, Pl. 50.) supposed perpendicular to one another; to change the system of co-ordinates in such manner that the new equation shall subsist between the two variable quantities AP, KP, the first of which is the same abscissa as before, and the second KP is the perpendicular let fall upon the axis AB of the abscissas from the point K where perpendiculars drawn from A, B, upon BM, AM, respectively, intersect.

Or, which amounts to the same, to find the geometrical locus of all the points K of mutual intersection of the three perpendiculars drawn from the angles of the several triangles MAB upon the opposite sides, or upon those sides produced.

Making the new co-ordinate $KP=z$, and the given line $AB=a$, we shall have, by the 19th formula in the table $z=\frac{x(a-x)}{y}$, or $y=\frac{x(a-x)}{z}$. This value of y being substituted for it in the given equation of the curve, whose generating point is at M, will produce the required equation between x and z.

Let it be supposed, for example, that the curve whose generating point is at M, is an ellipse of which AB (fig. 5. Pl. 50.) is the major axis. Let b be the minor axis of that ellipse, then will the equation of the curve be $y^2=\frac{b^2}{a^2}(ax-x^2)$. Substituting in this equation the value of y given above in x and z, we shall have $x^2(a-x)^2=z^2\frac{b^2}{a^2}(ax-x^2)$. Dividing the whole by $x(a-x)$, and multiplying by $\frac{a^2}{b^2}$, there will result

$$z^2=\frac{a^2}{b^2}(ax-x^2):$$

consequently the geometrical locus sought, is a new ellipse having AB for its minor axis, and for its major axis the fourth proportional $\frac{a^2}{b}$ to the two b, a, of the proposed ellipse, or the parameter of its minor axis.

Prob. II. The equation being given between the angles MAB, MBA (fig. 6. Pl. 50.) taken for co-ordinates, to find the equation of the same curve between the abscissa AP and the applicate PM, taken for new co-ordinates.

If u and v be put for the angles MAB, MBA respectively, we shall have by the 6th and 9th formula of the preceding table tan. $u=\frac{y}{x}$, tan. $v=\frac{y}{a-x}$: and it will be only requisite to substitute these values of u and v in the equation proposed, to obtain that which is sought between x and y.

Suppose, for example, that the proposed equation of the curve between u and v, is $u+v=m$, m being a constant quantity. Transposing v, we have $u=m-v$, or tan. $u=\frac{\text{tan. } m-\text{tan. } v}{1+\text{tan. } m \text{ tan. } v}$, or, tan. u + tan. m tan. u tan. v = tan. m − tan. v. Putting, then, in this equation, for tan. u, tan. v, their values above found, that is to say, $\frac{y}{x}$, $-\frac{y}{a-x}$, we shall have, after proper reduction,

$$x^2 \text{ tan. } m+y^2 \text{ tan. } m-ax \text{ tan. } m+ay=0;$$

an equation to the circle, which is therefore the curve required.

If, on the contrary, the equation were $u-v=m$, it would be easily shewn, by a similar process, that the curve sought is an equilateral hyperbola, of which the equation assumes this shape:

$$x^2 \text{ tan. } m-y^2 \text{ tan. } m-ax \text{ tan. } m+ay=0.$$

Hence it may be seen that a line whose equation is of a certain degree when taking a particular system of co-ordinates, may become of a degree higher, by assuming another system, the term co-ordinates being here used in its most extensive sense, and not confined to systems of lines under a constant given angle. Thus, the equation of the right line is only of the first degree, when referred to two fixed axes, by its abscissas and ordinates; but it becomes of the second, when referred to two fixed points A, B, and taking the angles MAB, MBA, for co-ordinates: reciprocally, the equation of the circle is of the second degree, when referred to two fixed axes by its abscissas and ordinates, while it is only of the first degree as we have just seen, when referred to two fixed points A and B upon its circumference, the co-ordinates being the angles MAB, MBA. It is the same with respect to the equilateral hyperbola, and indeed for all the conic sections, their equation being of the second degree when referred to any two fixed axes, and only of the first when referred to their foci, and taking for the system of co-ordinates the distances of the generating point from those two fixed points; or when we refer to one of their foci and the directrix, by taking for co-ordinates the distances of the generating point from such point and such line. There is an infinity of similar cases, such as those of the conchoid and the cissoid, the equations of which are

of the fourth degree when referred to two fixed axes, and only of the first when we take for co-ordinates those which are usually employed in their constructions. Hence it follows, that it is not always the most simple equation of a curve which is furnished by reference to two fixed axes: yet this method is, we conceive, the best when making a comparison between curves in general, though it is not always the easiest when we would investigate the properties of each case in particular.

It is now time to present the reader with some observations on curves of the higher orders, and particularly those which are classed under the third order of lines, or the second of curves. Newton reduces all curves of this kind to four classes of equations, expressing the relation between the abscissa and ordinate, viz.

in case 1, $xy^2+ey=ax^3+bx^2+cx+d$;
in case 2, $xy=ax^3+bx^2+cx+d$;
in case 3, $y^2=ax^3+bx^2+cx+d$;
in case 4, $y=ax^3+bx^2+cx+d$;

And under these four cases he enumerates 72 different curves. See Newton, Enumeratio, sect. 3.; Stirling Lineæ, &c. p. 83.

As, however, in so many different kinds of curves it must always be difficult to recollect what distinguishes them precisely, some mathematicians have been desirous to reduce the species to a smaller number, while at the same time they have shewn that each of the species comprehends several varieties, even more than are included in Newton's Enumeration. Thus Euler reduces the number of species of lines of the 3d order to sixteen. He assumes for the general equation comprizing all lines of this order, that which we have exhibited towards the beginning of this article. The first member of this equation, viz. $\alpha y^3+\beta y^2x+\gamma yx^2+\delta x^3$, being of an uneven number of dimensions, will have either one real simple factor, or three such factors; there may, therefore, be the four following general cases: 1. When only one simple factor is real: 2. When all three are real, and all unequal: 3. When two factors are equal: 4. When all the factors are equal. The first of these cases gives rise to Euler's 1st and 2d species; the second case, to species 3, 4, and 5; the third case, to species 6, 7, 8, 9, 10, 11, 12, 13; and the fourth case, to the 14th, 15th, and 16th species.

By taking at pleasure the obliquity of the co-ordinates, that is, of the axis of the abscissas and that of the applicates, the equations usually given for these lines may be greatly simplified; thus, taking t and u for the oblique co-ordinates, the equations of the various species will be as below:

1. $u(t^2+n^2u^2)+au^2+bt+cu+d=o$,
where neither n nor b are $=o$.

This kind has one hyperbolic asymptote of the nature $u=\frac{A}{t}$; and it comprises Nos. 33, 34, 35, 36, 37, 38, of Newton's enumeration.

2. $u(t^2+n^2u^2)+au^2+cu+d=o$,
where n must not be $=o$.

This kind has one hyperbolic asymptote expressed by $u=\frac{A}{t^2}$; and it includes the 39, 40, 41, 42, 43, 44, and 45 of Newton.

3. $u(t^2-n^2u^2)+au^2+bt+cu+d=o$,
where neither $n=o$, nor $b=o$, nor $\pm nb+c+\frac{a^2}{4n^2}=o$.

This kind has three hyperbolic asymptotes of the nature $u=\frac{A}{t}$, and comprises Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 24, 25, 26, 27, of Newton's enumeration.

4. $u(t^2-n^2u^2)+au^2+cu+d=o$,
where neither $n=o$, nor $c+\frac{a^2}{4n^2}=o$.

This kind has two hyperbolic asymptotes expressed by $u=\frac{A}{t}$, and one by $u=\frac{A}{t^2}$, it includes Nos. 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, of Newton's enumeration.

5. $u(t^2-n^2u^2)+au^2-\frac{a^2u}{4n^2}+d=o$,
where n must not be $=o$.

Here there are three hyperbolic asymptotes of the nature $u=\frac{A}{t^2}$, and the class includes Newton's 22, 23, 32.

6. $tu^2+at^2+bt+cu+d=o$,
where neither a nor $c=o$.

Here there is one hyperbolic asymptote of the nature $u=\frac{A}{t}$, and one parabolic asymptote defined by $u^2=At$; and the kind comprises Nos. 46, 47, 48, 49, 50, 51, 52 of Newton's enumeration.

7. $tu^2+at^2+bt+d=o$,
where a must not be $=o$.

Curves of this kind have one hyperbolic asymptote defined by $u=\frac{A}{t^2}$, and one parabolic asymptote defined by $u^2=At$; Newton's 53, 54, 55, and 56 species are comprised in the same class.

8. $tu^2+b^2t+cu+d=o$,
where neither b nor $c=o$.

This kind has one hyperbolic asymptote of the nature $u=\frac{A}{t}$, and includes Nos. 61 and 62 of Newton's enumeration.

9. $tu^2+b^2t+d=o$,
where b is not $=o$.

Here there is one hyperbolic asymptote denoted by $u=\frac{A}{t^2}$; this kind is the same as Newton's 63.

10. $tu^2-b^2t+cu+d=o$,
where neither b nor $c=o$.

Here are three hyperbolic asymptotes, one defined by $u=\frac{A}{t}$, and the two others which are respectively parallel are defined by $u=\frac{A}{t^2}$: this kind includes Newton's 57, 58, 59.

11. $tu^2-b^2t+d=o$,
where b must not be $=o$.

This kind has one hyperbolic asymptote of the nature $u=\frac{A}{t^2}$, and two others respectively parallel defined by $u=\frac{A}{t}$: Newton's 60th corresponds with this.

12. $tu^2+cu+d=o$,
where c must not be $=o$.

This agrees with Newton's 64th, and has two hyperbolic asymptotes, one of the form $u=\frac{A}{t}$, the other $u^2=\frac{A}{t}$.

13. $tu^2+d=o$,

This agrees with Newton's 65th, and has two hyperbolic asymptotes, one of the form $u=\frac{A}{t^2}$, the other $u^2=\frac{A}{t}$.

14. $u^3+at^2+cu+d=0$.

Here there is one parabolic asymptote defined by $u^3=At^2$; and the kind includes Nos. 67, 68, 69, 70, 71, of Newton's enumeration.

15. $u^3+atu+bt+d=0$,
where a must not be $=0$.

This agrees with Newton's 66th. There is one parabolic asymptote defined by $u^2=At$, and one rectilinear asymptote defined by $u=\frac{A}{t}$, the axis of the parabola being parallel to the rectilinear asymptote.

16. $u^3+at=0$.

This corresponds with Newton's 72d, and has one parabolic asymptote of the nature $u^3=At$.

If we understand the word *centre* to denote the intersection of diameters, then we may affirm that the 1st, 2d, 3d, 4th, and 5th species have a centre provided $a=0$, and in this case the centre is placed at the origin of the abscissas; that the 6th and 7th are absolutely without centres; that the 8th, 9th, 10th, 11th, 12th, and 13th have always one placed at the origin of the abscissas; as to the 14th, 15th, and 16th species, their centre is at an infinite distance, and consequently all those lines which we consider as diameters are respectively parallel.

For the other properties of these curves, such as the number and nature of their diameters, &c. except those which are mentioned below, the reader may consult the Analyses Infinitorum of Euler, and the works of Newton and Stirling before cited.

Lines of the fourth order are divided by Euler into 146 kinds, and those of the fifth into a much greater number, in so far that it would be extremely difficult to enumerate them.

1. The most curious and important properties of curve lines are deduced with much elegance and comparative simplicity from a contemplation of the nature and mutual relation of the roots of the equations representing those curves. Thus a curve being called of n dimensions, or a line of the nth order when its representative equation rises to n dimensions; then since for every different value of x there are n values of y, it will commonly happen that the ordinate will cut the curve in n or in $n-2$, $n-4$, &c. points, according as the equation has n, or $n-2$, $n-4$, &c. possible roots. It is not, however, to be inferred that a right line will cut a curve of n dimensions, in n, $n-2$, $n-4$, &c. points, only; for if this were the case a line of the 2d order, a conic section for instance, could only be cut by a right line in two points;—but this is manifestly incorrect, for although a conic parabola will be cut in two points by a right line oblique to the axis, yet a right line parallel to the axis can only cut the curve in one point.

2. It is true in general that lines of the order n cannot be cut by a right line in more than n points; but it does not hence follow that any right line whatever will cut in n points every line of the order n; it may happen that the number of intersections is $n-1$, $n-2$, $n-3$, &c. to $n-n$. The number of intersections that any right line whatever makes with a given curve line, cannot therefore determine the order to which a curve line appertains. For, as Euler remarks, if the number of intersections be $=n$, it does not follow that the curve belongs to the order n, but it may be referred to some superior order; indeed it may happen that the curve is not algebraic but transcendental. This case excepted, however, Euler contends that we may always affirm positively that a curve line which is cut by a right line in n points, cannot belong to an order of lines inferior to n. Thus, when a right line cuts a curve in 4 points, it is certain that the curve does not belong to either the second or third order of lines; but whether it be referred to the fourth, or a superior order, or whether it be transcendental, is not to be decided by analysis.

3. Dr. Waring has carried this enquiry a step farther than Euler, and has demonstrated that there are curves of any number of odd orders, that cut a right line in 2, 4, 6, &c. points only; and of any number of even orders that cut a right line in 2, 4, 6, &c. points only; and of any number of *even* orders that cut a right line in 3, 5, 7, &c. points only; whence this author likewise infers that the order of the curve cannot be denounced from the number of points in which it cuts a right line. See his Proprietates Algebraicarum Curvarum.

4. Every geometrical curve being continued, either returns into itself, or goes on to an infinite distance. And if any plane curve has two infinite branches or legs, they join one another either at a finite, or at an infinite distance.

5. In any curve, if tangents be drawn to all points of the curve; and if they always cut the abscissa at a finite distance from its origin; that curve has an asymptote, otherwise not.

6. A line of any order may have as many asymptotes as it has dimensions, and no more.

7. An asymptote may intersect the curve in so many points abating two, as the equation of the curve has dimensions. Thus, in a conic section, which is the second order of lines, the asymptote does not cut the curve at all; in the third order it can only cut it in one point; in the fourth order, in two points; and so on.

8. If a curve have as many asymptotes as it has dimensions, and a right line be drawn to cut them all, the parts of that measured from the asymptotes to the curve will together be equal to the parts measured in the same direction, from the curve to the asymptotes.

9. If a curve of n dimensions have n asymptotes, then the content of the n abscissas will be to the content of the n ordinates, in the same ratio in the curve and asymptotes; the sum of their n subnormals to ordinates perpendicular to their abscissas will be equal to the curve and the asymptotes; and they will have the same central and diametral curves.

10. If two curves of n and m dimensions have a common asymptote; or the terms of the equations to the curves of the greatest dimensions have a common divisor, then the curves cannot intersect each other in $n\times m$ points, possible or impossible. If the two curves have a common general centre, and intersect each other in $n\times m$ points, then the sum of the affirmative abscissas, &c. to those points will be equal to the sum of the negative; and the sum of the n subnormals to a curve which has a general centre will be proportional to the distance from that centre.

11. Lines of the third, fifth, seventh, &c. order, or any odd number, have at least two infinite legs or branches, running contrary ways; while in lines of the second, fourth, sixth, or any even

number of dimensions, the figure may return into itself, and be contained within certain limits.

12. If the right lines AP, PM, forming a given angle APM, cut a geometrical line of any order in as many points as it has dimensions, the product of the segments of the first terminated by P and the curve, will always be to the product of the segments of the latter, terminated by the same point and the curve, in an invariable ratio.

13. With respect to double, triple, quadruple, and other multiple points, or the points of intersection of 2, 3, 4, or more branches of a curve, their nature and number may be estimated by means of the following principles. 1. A curve of the order n is determinate when it is subjected to pass through a number $\frac{(n+1)(n+2)}{2}-1$ points. 2. A curve of the order n cannot intersect a curve of the order m in more than mn points.

Hence it follows that a curve of the second order, for example, can always pass through 5 given points (not in the same right line), and cannot meet a curve of the order m in more than mn points; and it is impossible that a curve of the order m should have 5 points whose degrees of multiplicity make together more than $2m$ points. Thus a line of the fourth order cannot have four double points; because the line of the second order which would pass through these four double points, and through a fifth simple point of the curve of the fourth dimension, would meet 9 times; which is impossible, since there can only be an intersection 2×4 or 8 times.

For the same reason, a curve line of the fifth cannot, with one triple point, have more than three double points: and in a similar manner we may reason for curves of higher orders.

Again, from the known position that we always make a line of the third order pass through nine points, and that a curve of that order cannot meet a curve of the order m in more than $3m$ points, we may conclude that a curve of the order m cannot have nine points the degrees of multiplicity of which make together a number greater than $3m$. Thus, a line of the fifth order cannot have more than 6 double points; a line of the 6th order, which cannot have more than one quadruple point, cannot have with that quadruple point more than 6 double points; nor with two triple points more than 5 double points; nor even with one triple point more than 7 double points. Analogous conclusions obtain with respect to a line of the fourth order, which we may cause to pass through 14 points, and which can only meet a curve of the order m in $4m$ points, and so on.

14. The properties of curves of a superior order, agree, under certain modifications, with those of all inferior orders. For, although some line or lines become evanescent, and others become infinite, some coincide, others become equal; some points coincide, and others are removed to an infinite distance; yet under these circumstances, the general properties still hold good with regard to the remaining quantities; so that whatever is demonstrated generally of any order, holds true to the inferior orders: and, on the contrary, there is hardly any property of the inferior orders, but there is some similar to it, in the superior ones.

For, as in the conic sections, if two parallel lines are drawn to terminate at the section, the right line that bisects these will bisect all other lines parallel to them; and is therefore called a *diameter* of the figure, and the bisected lines *ordinates*, the intersections of the diameter with the curve *vertices*; the common intersection of all the diameters the *centre*; and that diameter which is perpendicular to the ordinates, the *vertex*. So likewise in higher curves if two parallel lines be drawn, each to cut the curve in the number of points that indicate the order of the curve; the right line that cuts these parallels so, that the sum of the parts on one side of the line estimated to the curve, is equal to the sum of the parts of the other side; it will cut in the same manner all other lines that meet the curve in the same number of points; in this case also the divided lines are called *ordinates*, the line so dividing them a *diameter*, the intersection of the diameter and the curve *vertices*; the common intersection of two or more diameters the *centre*; the diameter perpendicular to the ordinates, if there be any such, the *axis*; and when all the diameters concur in one point, that is the *general centre*.

Again, the conic hyperbola, being a line of the second order, has two asymptotes; so likewise, that of the third order may have three; that of the fourth, four; and so on: and they can have no more. And as the parts of any right line between the hyperbola and its asymptotes are equal; so likewise in the third order of lines, if any line be drawn cutting the curve and its asymptotes in three points; the sum of two parts of it falling the same way from the asymptotes to the curve, will be equal to the part falling the contrary way from the third asymptote to the curve; and so of higher curves.

Also, in the conic sections which are not parabolic: as the square of the ordinate, or the rectangle of the parts of it on each side the diameter, is to the rectangle of the parts of the diameter, terminating at the vertices, in a constant ratio, viz. that of the latus-rectum, to the transverse diameter. So in non-parabolic curves of the next superior order, the solid under the three ordinates, is to the solid under the three abscissas, or the distances to the three vertices; in a certain given ratio. In which ratio if there be taken three lines proportional to the three diameters, each to each; then each of these three lines may be called a *latus rectum*, and each of the corresponding diameters a *transverse diameter*. And, in the common, or Apollonian parabola, which has but one vertex for one diameter, the rectangle of the ordinates is equal to the rectangle of the abscissa and latus rectum: so, in those curves of the second kind, or lines of the third kind which have only two vertices to the same diameter, the solid under the three ordinates, is equal to the solid under the two abscissas, and a given line, which may be reckoned the latus rectum.

Lastly, since in the conic sections where two parallel lines terminating at the curve both ways, are cut by two other parallels likewise terminated by the curve; we have the rectangle of the parts of one of the first, to the rectangle of the parts of one of the second lines, as the rectangle of the parts of the second of the former, to the rectangle of the parts of the segments of the latter pair, passing also through the common point of their division. So, when four such lines are drawn in a curve of the second kind and each meeting it in three points; the solid under the parts of the first line, will be to that under the parts of the third as the solid under the parts of the second, to that under the parts

of the fourth. And the analogy between curves of different orders may be carried much farther; as the reader may see by consulting the works of the principal writers mentioned below.

Catacaustic and Diacaustic Curves. See CATACAUSTIC and DIACAUSTIC.

Curve of equable Approach. See APPROACH.

Exponential Curve, is that defined by an exponential equation; that is, by an equation wherein is an exponential quantity, v. gr. x^x, a^x, &c. See TRANSCENDENTAL.

Curve Reflectoire, or *Anaclastic Curve,* a name given by M. de Mairan to the curvilinear appearance of the plane bottom of a vessel filled with water, to an eye perpendicularly above it. In this position the bottom of the vessel will appear to rise upwards from the point immediately under the eye outwards. This curve bears a near affinity to the superior conchoid of Nicomedes, the surface of the water being an asymptote to the apparent bottom, and corresponding to the directrix of the conchoid. Indeed the curve may be constructed in the same manner as the conchoid is in Emerson's 3d prop. using an ellipse instead of a circle. For the investigation of the nature of this curve, see Math. Repos, vol. ii. p. 364, &c.

Curve of quickest descent, that curve in which a heavy body will descend from a given point to another not in the same vertical line in the shortest time. Vinci and Galileo both observed that the descent of heavy bodies is made more speedily through an arc of a circle than by an inclined plane; but their proofs are imperfect in certain respects. It has since been demonstrated that the cycloid is the curve of quickest descent; gravity being supposed to act in parallel lines. Venturi finds that there is a minimum of time of descent in a circular arc, which may be determined in a synthetical method of considerable simplicity, by means of the following theorem. An arc of a circle which does not exceed 60° is a curve of speedier descent than any other curve which can be drawn within the same arc: and the arc of 90° is a curve of speedier descent than any other curve which can be drawn without the same arc.

Characteristic Triangle of a Curve, is the differential or elementary right-angled triangle whose three sides are, the fluxions of the absciss, ordinate, and curve; the fluxion of the curve being the hypothenuse. So, if pq be parallel to, and indefinitely near to the ordinate PQ, (Pl. 6.) and Qr parallel to the absciss AP; then Qr is the fluxion of the absciss AP, and qr the fluxion of the ordinate PQ, and Qq the fluxion of the curve AQ; hence the elementary triangle Qqr is the characteristic triangle of the curve AQ; and the three sides are $\dot{x}$, $\dot{y}$, $\dot{z}$; in which $\dot{x}^2+\dot{y}^2=\dot{z}^2$.

Family of Curves, is an assemblage of several curves of different kinds, all defined by the same equation of an indeterminate degree; but differently, according to the diversity of their kind. For example, suppose an equation of an indeterminate degree, $a^{m-1}x=y^m$: if $m=2$, then will $ax=y^2$; if $m=3$, then will $a^2x=y^3$; if $m=4$, then is $a^3x=y^4$; &c. all which curves are said to be of the same family or tribe.

The equations by which the families of curves are defined, are not to be confounded with the transcendental ones: for though with regard to the whole family, they be of an indeterminate degree; yet with respect to each several curve of the family, they are determinate; whereas transcendental equations are of an indefinite degree with respect to the same curve.

Organical description of Curves.—Sir Isaac Newton shews that curves may be generated by shadows. He says, if upon any infinite plane, illuminated from a lucid point, the shadows of figures be projected; the shadows of the conic sections will always be conic sections; those of the curves of the 2d kind, will always be curves of the 2d kind; those of the curves of the 3d kind will always be curves of the 3d kind; and so on, ad infinitum.

And, like as the projected shadow of a circle generates all the conic sections, so the 5 diverging parabolas, by their shadows, will generate and exhibit all the rest of the curves of the 2d kind: and thus some of the most simple curves of the other kinds may be found, which will form, by their shadows upon a plane, projected from a lucid point, all the other curves of that same kind. And in the French Memoirs may be seen a demonstration of this projection, with a specimen of a few of the curves of the 2d order, which may be generated by a plane cutting a solid formed from the motion of an infinite right line along a diverging parabola, having an oval, always passing through a given or fixed point above the plane of that parabola. The above method of Newton has also been pursued and illustrated with great elegance by Mr. Murdoch, in his treatise entitled. Newtoni Genesis Curvarum per umbras, seu Perspectivæ Universalis Elementa.

Mr. Maclaurin, in his Geometria Organica, shews how to describe several of the species of curves of the 2d order, especially those having a double point, by the motion of right lines and angles: but a good commodious description by a continued motion of those curves which have no double point, is ranked by Newton among the most difficult problems. Newton gives also other methods of description, by lines or angles revolving above given poles; and Mr. Brackenridge has given a general method of describing curves, by the intersection of right lines moving about points in a given plane. See Philos. Trans. No. 437, or Abr. vol. 8. p. 58; and some particular cases are demonstrated in his Exerc. Geometrica de Curvarum Descriptione.

The theory of curves forms a considerable branch of the mathematical sciences. Those who wish to advance beyond the knowledge of the circle and the conic sections, and to consider geometrical curves of a higher nature, and in a general view, will do well to study Cramer's Introduction à l'Analyse des Lignes Courbes Algebraiques, which the learned and ingenious author composed for the use of beginners. There is an excellent posthumous piece too of Maclaurin's, printed as an appendix to his Algebra, and entitled, De Linearum Geometricarum Proprietatibus Generalibus. The same author, at a very early age, gave a remarkable specimen of his genius and knowledge in his Geometria Organica; and he carried these speculations farther afterwards, as may be seen in the theorems he has given in the Philos. Trans. See Abr. vol. 8, p. 62. Other writings on this subject, beside the Treatises on the Conic Sections, are Archimedes de Spiralibus; Des Cartes Geometria; Dr. Barrow's Lectiones Geometricæ; Newton's Enumeratio Linearum Tertii Ordinis; Stirling's Illustratio Tractatûs Newtoni de Lineis Tertii Ordinis; Brackenridge's Descriptio Linearum Curvarum; M. De Gua's Usages de l'Analyse de Des Cartes; the treatise in the 2d volume of Euler's Analysis

Infinitorum; and a dissertation towards the end of Carnot's work called Geometrie de Position; besides many other tracts on curves in the Memoirs of different Academies and Societies.

CURUCUI, in ornithology. See FROGON.

To CU'RVET. *v. n.* (*corvettare*, Italian.) 1. To leap; to hold (*Drayton*). 2. To strike; to be licentious.

CURVETS, or CORVETS, in the manage, an air in which the horse's legs are more raised than in the demivolts; being a kind of leap up and a little forwards, wherein the horse raises both his fore-feet at once equally advanced (when he is going straight forward and not in a circle); and as his fore legs are falling, he immediately raises his hind legs as he did his fore; that is, equally advanced, and not one before the other: so that all his fore legs are in the air at once; and as he sets them down he marks but twice with them. Horses that are either dull or fiery are by no means proper for this exercise, it being one of the most difficult airs they can make, and which requires a great deal of patience in the horse, as well as judgment in the rider to perform it.

CURVILI'NEAR. *a.* (*curvus* and *linea*, Lat.) 1. Consisting of a crooked line (*Cheyne*). 2. Composed of crooked lines.

CURVILLET. In ornithology. See CHARADRIUS.

CU'RVITY. *s.* (from *curve.*) Crookedness.

CURULE CHAIR, in Roman antiquity, a chair adorned with ivory, wherein the great magistrates of Rome had a right to sit and be carried.

CURZOLA, an island on the coast of Dalmatia, in the Gulf of Venice, about 20 miles long. It has a town of the same name, and is subject to the Venetians. Lat. 43. 6 N. Lon. 17. 15 E.

CUSCO, a large town of Peru, in South America, formerly the capital of the empire of Peru, and the seat of the Yncas. It contains about 50,000 inhabitants, three-fourths of whom are native Peruvians. Lat. 12. 0 S. Lon. 73. 47 W.

CUSCUTA. Dodder. In botany, a genus of the class tetrandria, order digynia. Calyx four or five-cleft, inferior; corol one-petalled, four or five-cleft; capsule two-celled, opening transversely at the base. Seven species; scattered over the globe; of which two are common to our own country: viz.

1. C. Europæa. A parasytic plant found on nettles principally, but also on hops and flax; almost without leaves; with flowers nearly sessile, corol with a naked throat; stigmas acute.

2. C. epithymum: found on our own heaths; with sessile flowers; stamens with a crenate scale at the base of each; stigmas acute.

CUSH, the eldest son of Ham, and father of Nimrod; the other sons of Cush were Seba, Havilah, Sabtah, Raamah, and Sabtecha. Gen. x. 6—8. Though we know of no other person of scripture that is called by this name, yet there are three countries described by it in the scriptures. Whether the same man may have dwelt in them all at different times, or that there were some other men of this name, we are ignorant. The Vulgate, Septuagint, and other interpreters, both ancient and modern, generally translate Cush, *Ethiopia:* but there are many passages wherein this translation cannot be admitted. Indeed, we are rather inclined to think that by the land of Cush in scripture Arabia is always to be understood. Cush, according to the Arabian and Persian traditions, which name him Cutha, was king of the territory of Babel, and resided in Irak, where there were two cities of his name: and hence Dr. Hyde concludes that Cush reigned in Babylonia, and that his descendants removed into Arabia. For numerous particulars relating to the songs of Cush or Chus, or the ancient Cuthites, see the Analysis of Ancient Mythology, in 3 vols, 4to. passim.

CU'SHION. *s.* (*coussin*, French.) A pillow for the seat; a soft pad placed upon a chair (*Shakspeare*).

CUSHION (Ladies). In botany. See SAXIFRAGA.

CUSHION (Sea). In botany. See STATICE.

CU'SHIONED. *a.* (from *cushion.*) Seated on a cushion; supported by cushions.

CUSP, CUSPIS, properly denotes the point of a spear, or sword; but is used in astronomy to express the points, or horns, of the moon, or any other luminary.

CUSP, in astronomy, is used for the first point of each of the twelve houses, in a figure of the heavens.

CUSP, in the higher geometry, is used for the point or corner formed by two parts of a curve meeting and terminating there. See CURVE.

CUSPIDATE LEAF. (*cuspis*, the point of a sword or spear.) In botany, having the end sharp, like the point of a spear; or, terminating in a bristly point.

CUSPIDATE TEETH. In anatomy. See TEETH.

CUSSONIA. In botany, a genus of the class pentandria, order digynia; petals five, three-sided; margin of the receptacle dilated into a five-toothed calyx; fruit compressed, double, angular, crowned with the calyx and style. Two species; both natives of the Cape.

CU'STARD. *s.* (*cwstard*, Welsh.) A kind of sweetmeat made by boiling eggs with milk and sugar (*Hudibras*).

CUSTARD (Apple). In botany. See ANNONA.

CU'STODY. *s.* (*custodia*, Latin.) 1. Imprisonment; restraint of liberty (*Milton*). 2. Care; guardianship; charge (*Addison*). 3. Defence; preservation; security (*Bacon*).

CU'STOM. *s.* (*coustume*, Fr.) 1. Habit; habitual practice (*Locke*). 2. Fashion; common way of acting (*Samuel*). 3. Established manner (*Luke*). 4. Practice of buying of certain persons (*Addison*). 5. Application from buyers: as, *the trader has good* custom. 6. (In law.) A law or right not written, which, being

established by long use, and the consent of our ancestors, has been, and is, daily practised (*Cowell*).

CUSTOM, in strict language is distinguished from *habit:* the former is often used to denote a frequent reiteration of the same act; the latter, the effect that custom has on the mind or body. But perhaps it may be as well to apply the word customs to the peculiarities of manners which pervade large bodies of men; and habits to the peculiarities of individuals. According to this explication, a walk upon the quarter deck, though intolerably confined, becomes, however, so agreeable by custom, that a sailor in his walk on shore confines himself commonly within the same bounds. Lord Kaimes speaks of a man who had relinquished the sea for a country life: in the corner of his garden, he reared an artificial mount with a level summit, resembling most accurately a quarter deck, not only in shape but in size; and here he generally walked. In Minorca governor Kane made an excellent road the whole length of the island; and yet the inhabitants adhere to the old road, though not only longer but extremely bad. In this sense we may speak of *national customs,* which however widely they may differ from each other, have a powerful and permanent hold upon the affections. Though causes merely incidental may have conspired to introduce a peculiarity of manners, and to form national characters; yet being once formed, they become the sovereign rule of thought and action: they are diffused over the most extensive communities; and unless freedom of intercourse be held with neighbouring nations, not an individual can escape the impression. Thus it is that the inhabitants of one district contemplate those things as essential to well-being, which others hold in abhorrence; that one class of people reveres as incumbent duties, observances which others contemplate as the greatest absurdities; and some are inspired with invincible attachments to rites, which those who are not under the influence of the same prepossessions, justly consider as a disgrace to humanity.

"Whether custom should influence opinion, or opinion introduce custom, they both operate upon the affections, and generally manifest the plenitude of their power by the number and magnitude of the absurdities they render familiar and acceptable to the mind. These have for successive generations established the empire of imaginary beings; and the affections of reverence, love, and gratitude, have been thrown away upon ideal objects. These have sanctioned the most inveterate hatreds; have consecrated immoralities, and dignified theft, prostitution, and murder; have rendered the austerities of Brachmen and monks venerable to the multitude; have loaded the Gentoo female with insufferable disgrace who refuses to expire in torments from affection to her deceased husband; and, in the most enlightened countries they enjoin it upon the man of honour to murder his best friend for a hasty expression, or some other indiscretion of a momentary transport. Opinion has clothed a frail mortal with infallibility, or communicated that exclusive attribute of Deity to councils and synods, and bowed the necks of myriads to the empire of their decrees. It has elevated the worthless into the character of saints, and those who have most deserved the divine indignation have been invoked as the most prevalent intercessors. It has represented the Universal Parent as the tyrant, instead of the benevolent friend of mankind; conducted to the torture those who presumed to think more worthily of him, and it now threatens a total abnegation of his existence.

"But the diversities of opinions and manners, with their correspondent predilections and aversions, exceed enumeration. It is these diversities which furnish the amusement derived from the perusal of travels; and as no two nations on the globe correspond in every instance, the peculiarities of each illustrate in a striking manner the truth of our observations. They indicate the inconceivable variety of sentiments and affections which incidentally take place among beings of the same species, inhabitants of the same sublunary system, conversant with similar objects, and possessing similar powers of mind." (*Cogan on the Passions*, p. 235.)

CUSTOM-HOUSE, an office established in the maritime cities, and port towns, for the receipt and management of the proper customs and duties of importation and exportation.

CUSTOMS, in political economy, the duties, toll, tribute, or tariff, payable, by act of parliament, upon merchandize exported and imported; forming a branch of the perpetual taxes. (See TAX.) The considerations upon which this revenue (or the more ancient part of it, which arose only from exports) was invested in the king, were said to be two: 1. Because he gave the subject leave to depart the kingdom, and to carry his goods along with him. 2. Because the king was bound of common right to maintain and keep up the ports and havens, and to protect the merchant from pirates. Some have imagined they are called with us customs, because they were the inheritance of the king by immemorial usage and the common law, and not granted him by any statute: but sir Edward Coke hath clearly shown, that the king's first claim to them was by grant of parliament 3 Edw. I. though the record thereof is not now extant. And indeed this is in express words confessed by statute 25 Edw. I. c. 7. wherein the king promises to take no customs from merchants, without the common assent of the realm, "saving to us and our heirs the customs on wool, skins, and leather, formerly granted to us by the commonalty aforesaid."

By customs we understand, at present, says Blackstone, a duty or subsidy paid by the merchant at the quay upon all imported as well as exported commodities, by authority of parliament; unless where, for particular national reasons, certain rewards, bounties or drawbacks, are allowed for particular exports or imports.

The customs thus imposed by parliament are chiefly contained in two books of rates, set forth by parliamentary authority; one signed by sir Harbottle Grimeston, speaker of the house of commons in Charles II's time; and the other an additional one, signed by sir Spencer Compton, speaker in the reign of George I. to which also subsequent additions have been made. Aliens pay a larger proportion than natural subjects, which is what is now generally understood by the aliens duty; to be exempted from which is one principal cause of the frequent applications to parliament for acts of naturalization.

Total gross receipt of the customs of Great Britain, in the year ending 5th of January, 1807, with the payments to which it was subject, and the nett amount paid into the exchequer.

	£.	s.	d.
Balance in the hands of the different collectors on the 5th of January, 1806	50,843	16	3
Balance in the hands of the receiver general of Scotland	54,657	3	$8\frac{1}{2}$
Bills arising and remitted out of the revenue of 1805, but not brought to account till 1806	283,759	1	$3\frac{1}{4}$
Gross receipt of permanent and temporary duties within the year	12,379,983	19	$1\frac{3}{4}$
Total	£12,769,244	0	$4\frac{1}{2}$

	£.	s.	d.
Paid drawbacks, repayments, on over-entries, and bounties of the nature of drawbacks	1,560,346	11	$8\frac{1}{4}$
Bounties for promoting national objects	307,864	3	$1\frac{1}{4}$
Money imprest into the hands of out-port collectors, &c.	34,989	13	3
Paid towards the expences of the civil government of Scotland	76,445	18	$6\frac{1}{2}$
Charges of management	655,603	8	$10\frac{1}{2}$
Payments into the exchequer	9,733,813	12	$1\frac{1}{2}$
Balance in the hands of the different collectors on the 5th of January, 1807	58,594	11	$6\frac{1}{2}$
Balance in the hands of the receiver general of Scotland on the 5th of January, 1807	61,542	8	$7\frac{1}{2}$
Bills arising and remitted out of the revenue of 1806, but not brought to account till 1807	280,043	12	$7\frac{1}{2}$
Total	£12,769,244	0	$4\frac{1}{2}$

Deducting from the gross receipt of 12,379,983*l.* 19*s.* $1\frac{3}{4}$*d.* the amount paid for drawbacks on exportation, and in bounties for promoting national objects, being 469,983*l.* 14*s.* 2*d.* the total nett produce of the year will be 11,910,000*l.* 4*s.* $11\frac{1}{4}$*d.* which arose as follows:

	£.	s.	d.
From duties inwards	10,166,561	13	$4\frac{3}{4}$
——— outwards	621,566	16	$5\frac{1}{4}$
——— coastways	1,035,988	17	8
——— remittances from the plantations, quarantine duty, &c.	85,882	17	$5\frac{1}{4}$
Total	£11,910,000	4	$11\frac{1}{4}$

CU'STOMABLE. *a.* (from *custom.*) Common; habitual; frequent.

CU'STOMABLENESS. *s.* (from *customable.*) 1. Frequency; habit. 2. Conformity to custom.

CU'STOMABLY. *ad.* (from *customable.*) According to custom (*Hayward*).

CU'STOMARILY. *ad.* (from *customary.*) Habitually; commonly (*Ray*).

CU'STOMARINESS. *s.* (from *customary.*) Frequency; commonness (*Gov. of Tongue*).

CU'STOMARY. *a.* (from *custom.*) 1. Conformable to established custom; according to prescription (*Glanville*). 2. Habitual (*Tillotson*). 3. Usual; wonted (*Shakspeare*).

CU'STOMED. *a.* (from *custom.*) Usual; common (*Shakspeare*).

CU'STOMER. *s.* (from *custom.*) 1. One who frequents any place of sale for the sake of purchasing (*Roscommon*). 2. A common woman: obsolete (*Shakspeare*).

CUSTOS BREVIUM, the principal clerk belonging to the court of common pleas, whose business it is to receive and keep all the writs made returnable in that court, filing every return by itself; and, at the end of each term, to receive of the prothonotaries all the records of the nisi prius, called the posteas. The posteas are first brought in by the clerks of assize of every circuit to that prothonotary who entered the issue in the causes, in order to enter judgment; and after the prothonotary has entered the verdict and judgment thereupon into the rolls of the court, he delivers them over to the custos brevium, who binds them into a bundle. The custos brevium makes likewise entries of writs of covenant, and the concord upon every fine: by him also are made out exemplifications and copies of all writs and records in his office, and of all fines levied, which being engrossed, are divided between him and the chirographer, which last keeps the writ of covenant and the note, and the former the concord and foot of the fine. The custos brevium is made by the king's letters patent.

CUSTOS ROTULORUM, an officer who has the custody of the rolls and records of the sessions of peace, and also of the commission of the peace itself. He usually is some person of quality, and always a justice of the peace, of the quorum, in the county where he is appointed.

CUT

This officer is made by writing under the king's sign manual, being the lord chancellor's warrant to put him in commission. He may execute his office by a deputy, and is empowered to appoint the clerk of the peace, but he may not sell the place under divers penalties.

CU'STREL. *s.* 1. A shield-bearer. 2. A vessel for holding wine (*Ainsworth*).

To CUT. *v. a.* (from *couteau*, Fr. A knife.) 1. To penetrate with an edged instrument (*Shakspeare*). 2. To hew, as with an axe (*Chronicles*). 3. To carve; to make by sculpture (*Addison*). 4. To form any thing by cutting (*Exodus*). 5. To divide by passing through (*Pope*). 6. To pierce with an uneasy sensation (*Addison*). 7. To divide packs of cards (*Granville*). 8. To intersect; to cross: as, one line *cuts* another at right angles. 9. *To* CUT *down*. To fell; to hew down. 10. *To* CUT *down*. To excel; to overpower: a low phrase (*Addison*). 11. *To* CUT *off*. To separate from the other parts by cutting (*Judges*). 12. *To* CUT *off*. To destroy; to extirpate; to put to death untimely (*Howel*). 13. *To* CUT *off*. To rescind (*Smalridge*). 14. *To* CUT *off*. To intercept; to hinder from union (*Claren.*). 15. *To* CUT *off*. To put an end to; to obviate (*Clarendon*). 16. *To* CUT *off*. To withhold (*Rogers*). 17. *To* CUT *off*. To preclude (*Prior*). 18. *To* CUT *off*. To interrupt; to silence (*Bacon*). 19. *To* CUT *off*. To apostrophize; to abbreviate (*Dryden*). 20. *To* CUT *out*. To shape; to form (*Arbuthnot*). 21. *To* CUT *out*. To scheme; to contrive. 22. *To* CUT *out*. To adapt (*Rymer*). 23. *To* CUT *out*. To debar (*Pope*). 24. *To* CUT *out*. To excel; to outdo. 25. *To* CUT *short*. To hinder from proceeding by sudden interruption (*Dryden*). 26. *To* CUT *short*. To abridge: as, *the soldiers were* cut short *of their pay*. 27. *To* CUT *up*. To divide an animal into convenient pieces (*L'Estrange*). 28. *To* CUT *up*. To eradicate (*Job*).

To CUT. *v. n.* 1. To make way by dividing (*Arbuthnot*). 2. To perform the operation of lithotomy. 3. To interfere: as, a horse that *cuts*.

CUT. *part. a.* Prepared for use (*Swift*).

CUT. *s.* (from the verb.) 1. The action of a sharp or edged instrument. 2. The impression or separation of continuity, made by an edge or sharp instrument. 3. A wound made by cutting (*Wiseman*). 4. A channel made by art (*Knolles*). 5. A part cut off from the rest (*Mortimer*). 6. A small particle; a shred (*Hooker*). 7. A lot made by cutting a stick (*Locke*). 8. A near passage, by which some angle is cut off (*Hale*). 9. A picture cut or carved upon wood or copper, and impressed from it (*Brown*). 10. The stamp on which a picture is carved, and by which it is impressed. 11. The act or practice of dividing a pack of cards (*Swift*). 12. Fashion; form; shape; manner of cutting into shape (*Addison*). 13. A fool or cully (*Shakspeare*). 14. CUT *and long tail*. Men of all kinds (*Ben Jonson*).

CUT-WATER, the sharp part of the head of a ship below the beak. It is so called because it cuts or divides the water before it comes to the bow, that it may not come too suddenly to the breadth of the ship, which would retard it.

CUT-WATER. In ornithology. See RYNCHOPS.

CUT'ANEOUS. (*cutaneus, morbus*; from *cutis*, the skin.) Belonging to the skin, as cutaneous eruptions, &c.

CUTHA, in ancient geography, a country of Asia, inhabited by the descendants of Cush. See CUSH.

CUTICLE. (*cuticula, cutis*, the skin.) Epidermis. Scarf-skin. A thin, pellucid, insensible membrane, of a white colour, that covers and defends the true skin, with which it is connected by the hairs, exhaling and inhaling vessels, and the rete mucosum.

CUTICLE signifies, also, a thin skin formed on the surface of any liquor.

CUTI'CULAR. *a.* (from *cutis*, Latin.) Belonging to the skin.

CU'TIS. (*cutis.*) Derma. The true skin. A thick, fibrous, vascular, and nervous membrane, that covers the whole external surface of the body, and is the situation of the organ of touch, exhalation, and inhalation.

CUTIS ANSER'INA. (*anserina*; from *anser*, a goose.) The rough state the skin is sometimes thrown into from the action of cold or other cause, in which it looks like the skin of the goose.

CU'TLASS. *s.* (*coutelas*, French.) A broad cutting sword (*Shakspeare*).

CU'TLER. *s.* (*coutelier*, French.) One who makes or sells knives (*Clarendon*).

CUTLERIAN LECTURES, lectures on mechanics, founded in 1664, by sir John Cutler, who appointed a salary of 50*l.* a year, and settled it upon Mr. Hooke for life; the president, council, and fellows of the Royal Society, being entrusted to appoint both the subject and the number of the lectures.

CUTLERY, in the general sense, comprizes all those articles denominated edge-tools: but it is more particularly confined to the manufacture of knives, forks, scissors, penknives, razors, and swords. Damascus was anciently famed for its razors, sabres, and swords; the latter especially, being said to possess at once the qualities of flexibility, elasticity, and hardness.

Such articles of cutlery as do not require a fine polish, and are of low price, are made from blistered steel. Those which require the edge to possess great tenacity, while superior hardness is not essential, are made from sheer steel. The finer kinds of cutlery are made from steel which has been in a state of fusion, and which is termed cast-steel, no other kinds being susceptible of a fine polish. See STEEL.

Table-knives are mostly made of sheer steel, the tang, and shoulder, or bolster being of iron, and the blade part attached by giving them a welding heat. The knives after forging are hardened by heating them red hot and plunging them into water; they are afterwards heated over the fire till they become blue, they are then ground upon stones of large dia-

meter for the purpose of making their sides flat, since it is the disposition of small stones to make the sides concave. The blades are finished upon an instrument called a glazor, which consists of a circular piece of wood covered with leather, and coated with glue and emery. The handles of table knives are made of ivory, plassed horn, bone, stag horn, and wood, into which the blades are cemented with resin and pulverized brick, and for ivory, instead of the latter, whitening.

Forks are made almost altogether by the aid of the stamp and appropriate dies. The prongs only are hardened and tempered, by a method similar to that employed for the knives, being required of about the same degree of hardness.

The shank and bosom of the fork are ground upon a thin stone, which is round upon the face; it is of very rough and open texture, and is employed in the dry state. The prongs are ground upon a stone which is broad and flat upon the face; they are finished upon glazors coated with emery and glue; the insides of the prongs are dressed by means of a thin leathern strap, coated with glue and emery; for this purpose the fork is placed in an horizontal position, and the strap drawn backward and forward. Silver forks are a distinct branch of manufacture, being confined to the silversmiths: they are cast into moulds of fine sand, and finished in a manner similar to that of other silver goods.

Razors. Almost all razors are made of cast steel, the quality of which should be very good; the edge of a razor requiring the combined advantages of great hardness and tenacity. After the razor blade is forged, it is hardened by gradually heating it to bright red heat, and plunging it into cold water. It is tempered by heating it afterwards till a brightened part appears of a straw colour. Though this is generally performed by placing them upon the open fire, it would be more equally effected by sand, or what is still better, in hot oil, or fusible mixture, consisting of eight parts of bismuth, five of lead, and three of tin. A thermometer being placed in the liquid at the time the razors are immersed for the purpose of indicating the proper temperature, which is about 500 of Fahrenheit. Razors are ground crosswise upon stones, from four to seven inches in diameter, a small stone being necessary to make the sides concave. Razors having the concave form have been thought to shave with more facility, but if it be remarked that the canal formed by honing the razors is a portion of a wedge, the length of which is equal to the breadth of the razor, and of a thickness equal to that of the back, it will be readily seen that the concave form cannot possess any other advantage, than that of saving time in sharpening the razor, owing to the small surface exposed to the action of the hone or the strap. After the razor has been ground into its proper shape, it is finished by two processes, one called laping, or glazing, and the other polishing. The lap, or glazor, is formed of wood faced with an alloy of lead and tin; after its face is turned to the proper form and size, it is filled with notches, which are filled up with emery and tallow. This instrument gives to the razor a smooth and uniform surface, and consequently a fine edge. The last process is that of polishing; the polisher consists of a piece of circular wood running upon an axis, like that of the stone or the glazor. It is coated with leather, having from time to time its surface covered with crocus martis. The surface of the polisher when in motion moves at the rate of 75 feet in a second. This is slow when compared with the velocity of the stone and the glazor. The surface of the former moving at the rate of 576 feet in a second, and the latter with about twice that velocity. The handles of high priced razors are made of ivory and tortoiseshell, but in general they are of polished horn, which are preferred on account of their cheapness and durability. The horn is cut into pieces and placed between two corresponding dies, having a recess of the shape of the handle. The dies are previously heated to about 500° of Fahrenheit, and placed with the horn in a process of such power, that allowing the man's strength to be 200*lb*. it will be equal to 4300*lb*. By this process the horn admits of considerable extension; if the horn is not previously black, the handles are dyed black by means of a bathe of logwood and green vitriol. They afterwards require to be dressed first with sand and water, and lastly upon a buff, which is a species of glazor covered upon the face with buff leather, and smeared over with rottenstone and oil.

The clear horn handles are sometimes stained so as to imitate the tortoiseshell; this is effected by laying upon the handle a composition of three parts of potash, one of minium, ten of quick lime, and as much water as will make the whole into a pulpy mass. Those parts of the handle requiring darker shades, are covered thicker than the other. After this substance is laid upon the handles, they are placed before the fire for a few hours, the time requisite for giving the proper effect.

Penknives. The manufacture of penknives is divided into three departments: the first is the forging of the blades, the spring, and the iron scales; the second, the grinding and polishing of the blades; and the third, the handling, which consists in fitting up all the parts and finishing the knife. The blades are made of the best cast steel, and hardened and tempered to about the same degree with that of razors. In grinding they are made a little more concave on one side than the other; in other respects they are treated in a similar way to razors. The handles are covered with horn, ivory, and sometimes wood, but the most durable are those of stag-horn. The most general fault in penknives is that of being too soft. The temper ought to be not higher than a straw colour, as it seldom happens that a penknife is so hard as to snap on the edge.

Scissors. The beauty and elegance of polished steel is not displayed to more advantage

than in the manufacture of the finer kinds of scissors. The steel employed for the more valuable scissors should be cast steel of the choicest qualities; it must possess hardness and uniformity of texture for the sake of assuming a fine polish, great tenacity when hot for the purpose of forming the bow or ring of the scissor, which requires to be extended from a solid piece, having a hole previously punched through it. It ought also to be very tenacious when cold, to allow that delicacy of form observed in those scissors termed ladies scissors. After the scissors are forged as near to the same size as the eye of the workman can ascertain, they are paired, and the two sides fitted together. The bows and some other parts are filed to their intended form, the blades are also roughly ground, and the two sides properly adjusted to each other after being bound together with wire and hardened up to the bows. They are afterwards heated till they become of a purple colour, which indicates their proper temper. Almost all the remaining part of the work is performed at the grinding mill, with the stone, the lap, the polisher, and the brush. The latter consists of a circular piece of wood fitted upon an axis, and set upon the face with very strong bristles. It is used to polish those parts which have been filed, and which the lap and the polisher cannot touch. Previous to screwing the scissors together for the last time, they are rubbed over with the powder of quick-lime, and afterwards wiped clean with a skin of soft sheep leather. The quick-lime absorbs the moisture from the surface, to which the rusting of steel is justly attributed. Scissors are frequently beautifully ornamented by blueing and gilding, and also with studs of gold or polished steel. They are at present most elegantly ornamented by the gold being inlaid on a level with the surface of the steel, the gold surface being afterwards increased. The very large scissors are partly of iron and partly of steel, the shanks and bows being of the former. These, as well as those all of steel which are not hardened all over, cannot be polished; an inferior sort of lustre, however, is given to them by means of a burnish of hardened polished steel, which is very easily distinguished from the real polish by the irregularity of the surface. (For swords, see SWORD.)

Casting of Cutlery. From the great alliance of pig iron to steel, it has been long thought practicable to cast the steel into the articles required, and by that means save all the expence of forging, and at the same time make the articles much nearer their intended form than could possibly be done by the hammer. The steel in its perfect state is, however, incapable of this advantage, though when in a state of fusion it is capable of being cast into large ingots. It is so imperfectly liquid at that temperature as to preclude the possibility of casting it into articles so small as knives or scissors. That species of pig-iron called N°. 1, is susceptible of so perfect a liquidity as to be cast into needles and fish-hooks, and has been employed for making a great variety of cutlery, particularly forks and scissors. Immediately after the articles are cast, which is generally into wet sand, they are as brittle as glass, and in that state could not be used for any purpose. By being stratified with sand, and kept at a red heat for 24 hours, they assume a degree of softness and tenacity, which will allow them to bend to a considerable angle. This process is called annealing. This branch of manufacture has, of late, undergone very considerable improvements by an invention of Mr. Lucas of Sheffield, for which he has obtained a patent. The articles are cast of the most fusible pig-iron, and are afterwards converted into a state of steel by cementation. The pig-iron, which only differs from steel in containing an excess of carbon, is stratified in close vessels, with some substance capable of furnishing oxygen, with which the carbon of the pig-iron combines, forming carbonic acid, which escapes in the form of gas. (*British Encyclopedia*).

CU'TPURSE. *s.* (*cut* and *purse.*) One who steals by the method of cutting purses; a thief; a robber (*Bentley*).

CU'TTER. *s.* (from *cut.*) 1. An agent or instrument that cuts any thing. 2. A nimble boat that cuts the water. 3. The teeth that cut the meat (*Ray*). 4. An officer in the exchequer that provides wood for the tallies, and cuts the sum paid upon them (*Cowell*).

CUT-THROAT. *s.* (*cut* and *throat.*) A ruffian; a murderer; an assasin (*Knolles*).

CUT-THROAT. *a.* Cruel; inhuman; barbarous (*Carew*).

CU'TTING. *s.* (from *cut.*) A piece cut off; a chop (*Bacon*).

CUTTING, in heraldry, is used for the dividing a shield into two equal parts, from right to left, parallel to the horizon, or in the fesse-way.

CUTTING IN WOOD, xylography: a particular kind of sculpture, or engraving, denominated from the matter on which it is employed. That sort of engraving which is called cutting in wood, was the first invented. It is used for initial letters, head and tail pieces of books, and even for schemes and other figures, to save the expence of engraving on copper: and for prints and stamps for paper, calicoes, linen, &c. The art of cutting in wood was certainly carried to very great perfection about one hundred and fifty years ago, and has since been revived with very great success by Mr. Bewick, whose engravings of animals, &c. on wood, may vie in beauty and excellence with the choicest copper plates. The cutter in wood needs no other instruments than little sharp knives, chisels, and gravers of different sizes. The first thing he does, is to take a plank or block of pear-tree, or box, which he prepares of the size and thicknes intended, and makes it very even and smooth on the side to be cut: on this block he draws the design with a pen or pencil just as it ought to be printed. Those who cannot draw their own designs, make use of those done by another, which they fasten

on the block with paste, the strokes or lines being turned towards the wood: when the paper is dry, they wash it gently over with a sponge dipped in water; which done, they take off the paper by degrees, still rubbing it a little with the tip of the finger, till there is nothing left on the block but the strokes of ink that form the design, which mark out so much of the block as is to be spared, or left standing; the rest they cut off and take away as curiously as they can, with the point of their sharp instruments.

CUTTING IN ACTION, in the manage called interfering, is lacerating the round inside projecting part of the fetlock-joint, with the edge of the shoe, upon the foot of the opposite leg. This arises much more frequently from ill-usage or neglect in the keeper, than from any imperfection or defect of the horse: more horses cut from being broken and put into work too young, rode too long journeys in a day, or over-worked when weary, than from any other causes whatever. Some horses, it is true, cut from their earliest age, particularly those narrow in the chest. Carriage horses, too, very frequently cut behind; but this must in a great measure be occasioned by the projecting parts and cavities in the pavement, against which the surest footed horse cannot be always prepared.

CU'TTLE. *s.* A foul-mouthed fellow (*Shakspeare*).

CUTTLE-FISH, in helminthology. See SEPIA.

CUVIEREAN SYSTEM OF ZOOLOGY, an ingenious system lately invented by M. Cuvier, for which see ZOOLOGY.

CUXHAVEN, a sea-port of Bremen, situated on the German Ocean, between the mouths of the Elbe and the Weser.

CYANELLA, in botany, a genus of the class hexandria, order monogynia. Corol six-petalled, the three lower ones hanging forwards; lowest stamen declined, and longer than the rest. Four species, all natives of the Cape.

CYANITE, in oryctology. See ZEOLITHUS.

CYANUS. (*cyanus*, κυανος, cœrulean or sky-blue: so called from its colour.) Blue-bottle. Corn-flower. The flowers of this plant, centaurea cyanus; calycibus serratis; foliis linearibus, integerrimis, infimis dentatis, of Linnéus, were formerly in frequent use; but their antiphlogistic, antispasmodic, cordial, aperient, diuretic, and other properties, are now, with great propriety, forgotten. See CENTAUREA.

CY'ATHEA, in botany, a genus of the class cryptogamia, order filices. Fructification in roundish, scattered dots, seated on a columnar receptacle, within the calyx-like incolucre, which opens at top. Nine species, several of the trunks arboreous.

CYATHIFORM, in botany. (*cyathus*, a drinking cup or glass.) Glass-shaped or cup-shaped. Cylindric, only widening a little at the top. Applied to the calyx in mauritia, and to the corol in peziza acetabulum and cyathoides.

CYATHUS, a measure among the Greeks and Romans, both of the liquid and dry kind. It was equal to an ounce, or the 12th part of a pint.

CYATHUS, in botany, a genus of the class cryptogamia, order fungi. Fungus campanulate or cylindrical, bearing lentiform capsules within. Six species.

CYBELE, in pagan mythology, the daughter of Cœlus and Terra, and wife of Saturn. She is supposed to be the same as Ceres, Rhea, Ops, Bona Mater, Magna Mater, Berecynthia, Dindymene, &c. According to Diodorus, she was the daughter of a Lydian prince, and as soon as she was born she was exposed on a mountain. Cybele was generally represented as a robust woman far advanced in her pregnancy, to intimate the fecundity of the earth. She held keys in her hand, and her head was crowned with rising turrets, and sometimes with the leaves of an oak. She sometimes appears riding in a chariot drawn by two tame lions: Atys follows by her side, carrying a ball in his hand, and supporting himself upon a fir-tree which is sacred to the goddess. Sometimes she is represented with a sceptre in her hand, with her head covered with a tower. She is also seen with many breasts, to show that the earth gives aliments to all living creatures; and she generally carries two lions under her arms. From Phrygia the worship of Cybele passed into Greece, and was solemnly established at Eleusis under the name of the Eleusinian mysteries of Ceres.

CYCAS, in botany, a genus of the class monoecia, order polyandria. Male: ament cone-line, the scales covered every where underneath with pollen. Fem.: spadix sword-shaped: genus immersed in the angles, solitary; style one; drupe with a woody nut. Two species, natives of the East Indies.

1. C. circinalis. Sago tree, forty feet high, with pinnated leaves seven or eight feet long: flowers racemed at the peduncles of the leaves, succeeded by an oval fruit about the size of large plums, of a red colour when ripe and sweet flavour. Each fruit contains a hard brown nut, inclosing a white meat of the taste of a chesnut: and affords a considerable portion of the bread of the natives. The trunk also affords by beating thin layers of it produced by the saw, and afterwards infusing the layers in water, a nutriment of a similar kind. The sago hereby obtained, however, is inferior to the true sago made from the pith of the ARECA OLETACEA, which see.

2. C. revoluta. Broad-broom, or bread tree, with leaflets revolute at the margin. The natives are said to employ the pith of this tree in making their bread: for which purpose they put considerable quantities of it in dried calf or sheep-skins, which they bury in the earth till it becomes sufficiently mellow and tender to be kneaded with water into dough.

CYCEON, a name given by the ancient poets and physicians to a mixture of meal and

water, and sometimes of other ingredients, as wine, honey, &c.

CYCLADES, the ancient name of a cluster of islands, situated between Negropont and Candia, belonging to the Turks. Delos is the centre island.

CYCLADES (Great), a cluster of about 10 islands in the South Sea, west of Otaheite, discovered by captain Cook, in 1774. There are several volcanoes on these islands, yet they are well inhabited. They lie in lat. 18. 30 S. and in lon. 170. 0 W.

CYCLAMEN. Sow bread. In botany, a genus of the class pentandria, order monogynia. Corol wheel-shaped, reflected, with a very short tube and prominent throat; berry covered with a capsule. Four species; three of them natives of the south of Europe and Asia; and one, c. Europœum, indigenous to the shady woods of our own country, with heart-shaped, angular, toothed leaves. They are all low herbaceous perennials, with tuberous roots; and when cultivated, with highly ornamental and variegated flowers, frequently accompanied with an exquisite fragrance. The species are best propagated by seeds; the varieties must be preserved by dividing the roots. They are easily cultivated with a little care to preserve the young plants from severe frosts.

CY'CLAS, in botany, a genus of the class decandria, order monogynia. Calyx four-parted; corolless; filaments inserted in the neck of the style, flexuose; legume roundish, winged, one-seeded. Two species; both Guiana trees.

CYCLE, a certain period or series of numbers proceeding orderly from first to last, then returning again to the first, and so circulating perpetually.

Cycles have chiefly arisen from the incommensurability of the revolutions of the earth and celestial bodies to one another. The apparent revolution of the sun about the earth has been arbitrarily divided into 24 hours, which is the basis or foundation of all our mensuration of time, whether days, years, &c. But neither the annual motion of the sun, nor that of the other heavenly bodies, can be measured exactly, and without any remainder, by hours, or their multiples. That of the sun, for example, is 365 days 5 hours 49 minutes nearly; that of the moon, 29 days 12 hours 44 minutes nearly.

Hence, to swallow up these fractions in whole numbers, and yet in numbers which only express days and years, cycles have been invented; which, comprehending several revolutions of the same body, replace it, after a certain number of years, in the same points of the heaven whence it first departed; or which is the same thing, in the same place of the civil calendar.

The most remarkable of these are the following:

The cycle of the sun is a revolution of 28 years, in which time the days of the months return again to the same days of the week; the sun's place to the same signs and degrees of the ecliptic on the same month and days, so as not to differ one degree in 100 years; and the leap-years begin the same course over again with respect to the days of the week on which the days of the month fall. The cycle of the moon, commonly called the golden number, is a revolution of 19 years; in which time, the conjunctions, oppositions, and other aspects of the moon, are within an hour and a half of being the same as they were on the same days of the months 19 years before. The indiction is a revolution of 15 years, used only by the Romans for indicating the times of certain payments made by the subjects to the republic. It was established by Constantine, A. D. 312.

The year of our Saviour's birth, according to the vulgar era, was the ninth year of the solar cycle, the first year of the lunar cycle; and the 312th year after his birth was the first year after the Roman indiction. Therefore, to find the year of the solar cycle, add 9 to any given year of Christ, and divide the sum by 28, the quotient is the number of cycles elapsed since his birth, and the remainder is the cycle for the given year: If nothing remains, the cycle is 28. To find the lunar cycle, add one to the given year of Christ, and divide the sum by 19; the quotient is the number of cycles elapsed in the interval, and the remainder is the cycle for the given year: If nothing remains, the cycle is 19. Lastly, subtract 312 from the given year of Christ, and divide the remainder by 15; and what remains after this division is the indiction for the given year: if nothing remains, the indiction is 15.

The cycle of Easter, also called the Dionysian period, is a revolution of 532 years, found by multiplying the solar cycle 28 by the lunar cycle 19. If the new moons did not anticipate upon this cycle, Easter-day would always be the Sunday next after the full moon which follows the 21st of March. But, on account of the above anticipation, to which no proper regard was had before the late alteration of the style, the ecclesiastic Easter has several times been a week different from the true Easter within this last century: which inconvenience is now remedied by making the table, which used to find Easter for ever, in the Common Prayer Book, of no longer use than the lunar difference from the new style will admit of. The earliest Easter possible is the 22d of March, the latest the 25th of April. Within these limits are 35 days, and the number belonging to each of them is called the number of direction; because thereby the time of Easter is found for any given year.

CYCLES, in harmonics, are certain determinate periods or series of pulses or vibrations, excited in the air by the consonance of two musical sounds.

Dr. Smith (Harmonics, p. 56) distinguishes these, 1st, into simple cycles, when the least terms of the ratio expressing a small interval differ but by 1; 2d, complex cycles, when the least terms of such a consonance differ by more unity; 3d, short cycles, formed by the pulses

of perfect consonances, or such whose ratios are expressed in small numbers; and 4th, long cycles, of the pulses of imperfect unisons, or other consonances, which are not expressible but by high or surd numbers.

CYCLIDIUM, in zoology, a genus of the class vermes, order infusoria. Worm invisible to the naked eye; very simple; pellucid; flat; orbicular or oval. Seven species, found chiefly in vegetable infusions.

CYCLOGRAPH, in practical geometry, an instrument contrived, as its name imports, for describing the arcs of circles. The simplest kind of cyclograph next to the compasses is formed of two rulers, so jointed together as to be susceptible of standing at any angle between the legs: then by causing the legs or rulers to slide between two pins, while a pencil is fixed at their angular point, the pencil will describe an arc or segment of a circle capable of containing the angle at which the rulers are set.

CYCLOID, a mechanical or transcendental curve, the nature of which will be understood from the subsequent definitions and propositions.

Def. 1. When a circle is made to rotate on a rectilinear basis, the figure described on the plane of the basis by any point in the plane of the circle is called a *trochoid.* A circle concentric with the generating circle, and passing through the describing point, may be called the describing circle.

Def. 2. If the describing point is in the *circumference* of the rotating circle, the two circles coincide, and the curve is called a *cycloid*

Def. 3. If a circular basis be substituted for a rectilinear one, the trochoid will become an *epitrochoid,* and the cycloid an *epicycloid.*

Scholium 1. The terms have hitherto been too promiscuously employed; the terms cycloid and trochoid have been used indifferently; and the term epicycloid has comprehended the epitrochoid, the terms prolate and contracted being sometimes added to imply that the describing point is within or without the generating circle. The interior epicycloid and epitrochoid may very properly be distinguished by the names hypocycloid and hypotrochoid, whenever they are the separate objects of consideration. The different species of epicycloids may be denominated according to the number of their cusps, combined with that of the entire revolutions which they comprehend; for instance, the epicycloid described by a circle on an equal basis is a simple unicuspidate epicycloid; and if the diameter of the generating circle be to that of the basis as 5 to 2, the figure will be a quintuple bicuspidate epicycloid. If the describing circle of a trochoid or cycloid be so placed as to touch the middle of the basis, and each of the ordinates parallel to the basis be diminished by the corresponding ordinate of the circle, the curve thus generated has been denominated the companion of the trocloid, the figure of the sines, and the harmonic curve.

Scholium 2. The invention of the cycloid has been attributed by Wallis (Ph. Tr. for 1697, n. 229), to cardinal Cusanus, who wrote about the year 1450: but it seems to be at least as probable that the curve which appears in Cusanus's figure was meant for the semicircle employed in finding a mean proportional. Bovillus, in 1501, has a juster claim to the merit of the invention of the cycloid and trochoid, if it can be any merit to have merely imagined such curves to exist. In 1599, Galileo gave a name to the common cycloid, and attempted its quadrature, but having been accidentally misled by repeated experiments on the weight of a flat substance cut into a cycloidal form, he fancied that the area bore an incommensurable ratio to that of the circle, and desisted from the investigation. Mersennus described the cycloid, in 1615, under the name of la trochoide, or la roulette, but he went no further. Roberval seems to have first discovered the comparative quadrature and rectification of the cycloid, and the content of a cycloidal solid, about the year 1635, but his treatise was not printed until 1695. Torricelli, in 1644, first published the quadrature and the method of drawing a tangent. Wallis gave, in 1670, a perfect quadrature of a portion of the cycloid. The epicycloid is said to have been invented by Rœmer; its rectification and evolute were investigated by Newton in the Principia, published in 1687. In 1695 Mr. Caswell shewed the perfect quadrability of a portion of the epicycloid, and Dr. Halley immediately published an extension of Caswell's discovery, together with a comparison of all epitrochoidal with circular areas. M. Varignon is also said to have reduced the rectification of the epitrochoid to that of the ellipsis, in the same year. Nicole, Delahire, Pascal, Reaumur, Maclaurin, the Bernoullis, the commentators on Newton, and many others, have contributed to the examination of cycloidal curves, both in planes and in curved surfaces; and Waring, the most profound of modern algebraists, has considerably extended his researches upon the nature of those lines which are generated by a rotatory progression of other curves.

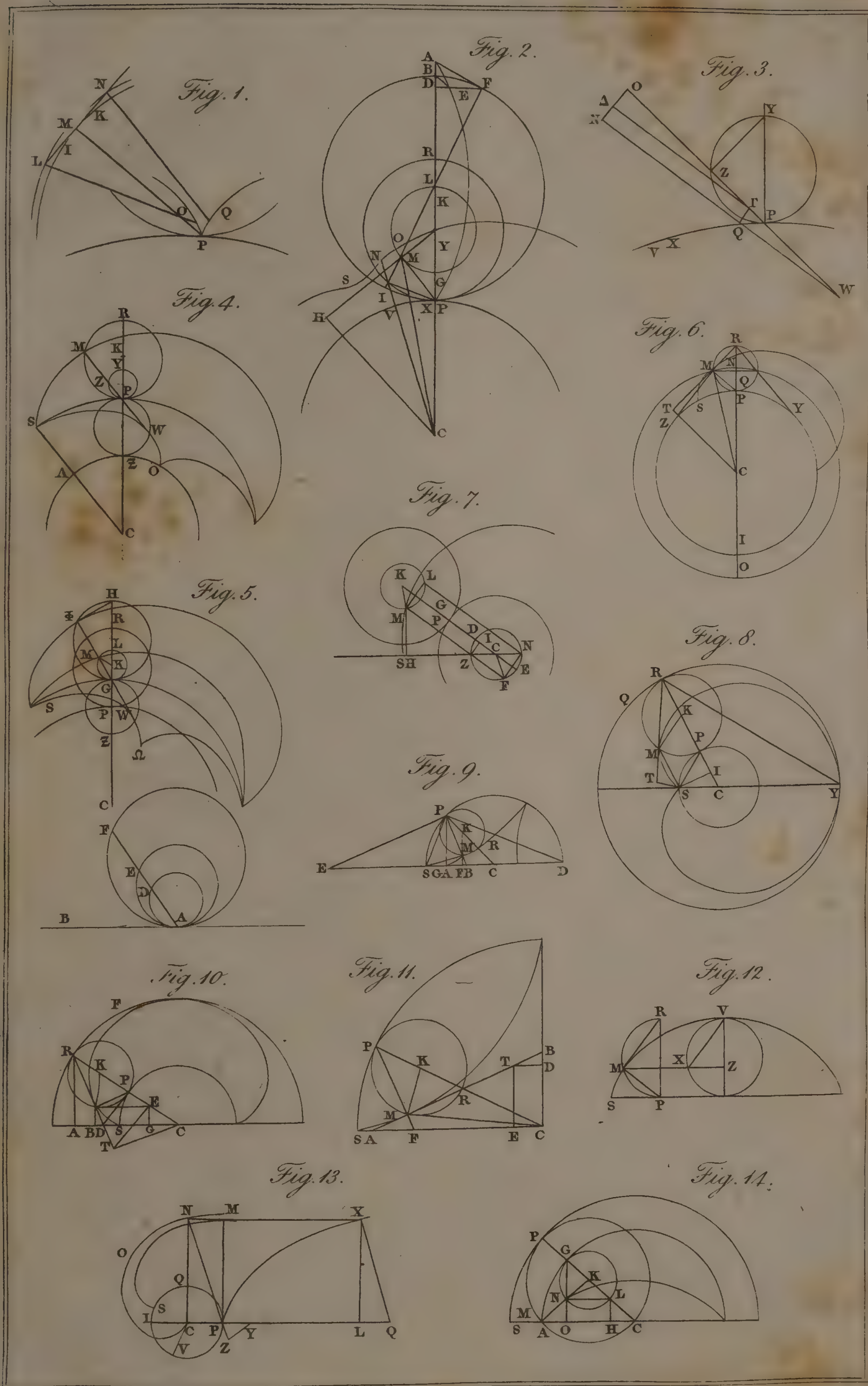
Prop. I. Theorem. Pl. 52. fig. 1. In any curve generated by the rotation of another on any basis, the right line joining the describing point, and the point of contact of the generating curve and the basis, is always perpendicular to the curve described.

It may by some be deemed sufficient to consider the generating curve as a rectilinear polygon of an infinite number of sides; since, in this point of view, the proposition requires no further demonstration; and, indeed, Newton and others have not scrupled to take it for granted: but it is presumed that a more rigid proof will not be considered as superfluous. Let M be the describing point, and P the point of contact; and let LO, MP, and NQ, be successive positions of the same chord of the generating curve at infinitely small distances; then it is obvious, and easily demonstrable, that the arcs OP and PQ, described by the point P of the generating curve in its passage from O to P, and from P to Q, will be perpendicular to the basis at P, and will therefore touch each other. Let the arcs L,IMK and N, be described with the radius PM, on the centres O, P, and Q. Then the curve described by M will touch IMK; for since O and Q lie ultimately in the same direction from P, if L be above IMK, N will also be above it, since these points must be in the circles L and N, and infinitely near to M; and if L is below IMK,N, for the same reason, must be below it; and M is common to the circle and the curve, therefore the curve touches the circle IMK at M, and is perpendicular to the radius PM.

Prop. II. Problem. To draw a tangent to a cycloidal curve at any given point.

On the given point as a centre describe a circle equal to the describing circle of the curve, and

CYCLOIDS.



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from the intersection of this circle, with the line described by the centre of the generating circle, let fall a perpendicular on the basis; the point thus found will be the point of contact, and the tangent will be perpendicular to the right line joining this point of contact and the given point, by the first proposition. It will be obvious, from inspection, which of the two intersections of the circle to be described, with the tract of the centre, is to be taken as the place of that centre corresponding to the given point.

Prop. III. Problem. Fig. 2. To find the length of an epitrochoid.

Let C be the centre of the basis VP, K that of the rotating circle PR, and of the describing circle GL, P the point of contact, and M the describing point. Then joining MXC, and supposing VX to be an element representing the motion of the point P in either the basis or the generating circle, draw the arc MN on the centre C, and join CVN, then NM will represent the motion of the point M as far as it is produced by the revolution round the centre C: take MO to VX as GK to PK, then MO will be the motion of M arising from the revolution round K, and NO will be the element of the curve produced by the joint motion. Let CH be parallel to PM, then CX or CP : CM : : VX : MN, and PK : MK : : CP : HM : : VX : MO, therefore CM : HM : : MN : MO and these lines being perpendicular to CM, HM, the triangle NMO is similar to CMH, and MN : NO : : CM : CH, hence CP : CH : : VX : NO. Take PY to CP as PK to CK, then CH : CP : : PM : PY : : NO : VX. On L describe the circle PFB, and draw IMLF: let FD be perpendicular to PRB, take DE to DF as PL, and E will be always in the ellipsis BEP: let AE and AF be tangents to the ellipsis and circle at E and F; then the increment of the arc BF will be to MO as PL to GL, and to VX as PL to PR. Join GM, and parallel to it draw PI; then PIL is a right angle, and ILP = AED, and IM : IL : : PG : PL : : DE : DF, by construction; therefore the figure IPML is similar to DAEF, as PL to PM so is AF to AE, and so is the increment to the arc BF to that of BE; but the increment of BF is to VX as PL to PR, therefore the increment of BE is to VX as PM to PR. Now, it was proved that NO : VX : : PM : PY; therefore the increment of BE is to NO as PY to PR, or as CP to 2 CK: and the whole elliptic arc BE is to the whole SM as the radius of the basis to twice the distance of the centres.

Cor. 1. The fluxion of every cycloidal arc is proportional to the distance of the describing point from the point of contract.

Cor. 2. In the epicycloid the ellipsis coincides with its axis BP, and the arc BE with BD, which is double the versed sine of half the arc GM, in the describing or generating circle: therefore the length of the curve is to this versed sine as four times the distance of the centres to the radius of the basis.

Prop IV. Problem. Fig. 2, 3. To find the centre of curvature of an epitrochoid.

Let PY be, as in the last proposition, to CP as PK to CK, and on the diameter PY describe the circle PZY, cutting PO in Z: take OW a third proportional to OZ and OP, and W will be the centre of curvature. For, let QP = VX be the space described by P, while NO is described by O; it is obvious from prop. 1, that the intersection of NQ and OP must be the centre of curvature. Let QΓ be perpendicular to ΓΔ parallel to QN; then, by prop. 3, NO : VX or QP : : PO : PY, but by similar triangles QP : CΓ : : PY : PZ; therefore NO : QΓ : : PO : PZ, and by division, NO : ΔO : : OP : OZ, and by similar triangles : : OW : OΓ or OP.

Cor. When Z coincides with O or M, OW is infinite; therefore whenever PZY intersects the describing circle, the epitrochoid will have a point of contrary flexure at the same distance from C as this intersection: and the circle PZY is given when the basis and generating circle are given, whatever the magnitude of the describing circle may be.

Prop. V. Problem. Fig. 4. To find the evolute of an epicycloid. In the epicycloid SM, the point M being in the circumference of PMR, PZ will be to PM in the constant ratio of PY to PR, and MZ to PM as RY to PR; and PM to MW in the same ratio; hence PM : PW : : RY : PY : : CR : CP, therefore the point W is always in a circle PWΞ of which the radius is to PK in that proportion and which touches SP in P. On the centre C describe a circle ΔΞΘ touching PWΞ in Ξ; then, since CR : CP : : PR : PΞ, we have by division CR : CP : : CP : PΞ, and the circle PWΞ being to ΔΞΘ as PMR to SP, the arc PM being equal to SP, the similar arc PW will be equal to ΔΞ, and taking ΔΞΘ = PWΞ, Ξ will be always equal to ΞW, and W in a curve = ΘWS similar to SM; of which it is the evolute.

Prop. VI. Problem. Fig. 5. To find the area of an epitrochoid.

On the centre C describe a circle touching the epitrochoid in S, take GΠ to GC as PR to PC, and let the circle GΦΠ describe on the basis SG the epicycloid SΦ. Then taking GM always to GΦ as GL to GΠ, M will be in the epitrochoid SM; for the angular motion of the chord GΦ, is the same as that of GM in the primary epitrochoid. Let SΩ be the evolute of SΦ, and GWΞ its generating circle. On diameters equal to ΞG, ΞL, and ΞΠ, describe three circles, AD, AE, and AF, touching the right line AB in A; let the angle BAD be always equal to GΠΦ, and it is evident that AD, AE, and AF, will be equal respectively to WG, WM, and WΦ. But the angular motion of WG on W being equal to the sum of the angular motions of GM on G and CG on C, is to that of AF, or of GM, or half that of KM, in the ratio of CΠ to CG, or CR to CP; therefore the fluxions of the areas SWG, SWM, and SWΦ are to those of the segments AD, AE, and AF, in the same ratio; and that ratio being constant, the whole areas, and their differences, are also respectively to each other as CR to CP.

Scholium. The quadrable spaces of Halley are those which are comprehended between the arc of the epitrochoid, that of the describing circle, and that of a circle concentric with the basis and cutting the describing circle at the extremities of its diameter.

Prop. VII. Problem. Fig. 6. To find a central equation for the epicycloid.

Let CT be perpendicular to RT, the tangent at the point M, then PMR will be a right angle, and PM parallel to CT. On the centre C describe through M the circle MNO, and let MQ be perpendicular to RO. Then the rectangle OQN = PQR, OQ : PQ : : QR : QN, by addition OQ : PQ : : OR : PN; hence by division OP : PQ : : IR : PN, and $PQ = \frac{OPN \text{ or } INP}{IR}$. But $PMq = PR \times PQ = \frac{PR}{IR} \times INP$; and by similar triangles

CT : CR : : PM : PR, whence $CTq = \frac{CRq}{PRq} \times PMq = CRq \times \frac{INP}{IRP}$. Let MZ and RY be tangents to SP, then INP = MZy, and IRP = RYq, CT = CR $\times \frac{MZ}{RY}$, and CT will be to MZ in the constant ratio of CR to RY. Putting CP = a, CR = b, CM = s, CT = u, then $uu = bb\frac{ss-aa}{bb-aa}$.

Prop. VIII. Problem. Fig. 7. To find a geometrical equation for the conchoidal epitrochoid.

Let CP = PK. On the centre C describe a circle equal to GM, cutting SC in Z. Join MZF, then the arc DZ = GM, and MZ is parallel to CK, therefore EF is also equal to DZ or GM, CF is parallel to KM, and MF = CK: therefore this epitrochoid is the curve named by Delahire the conchoid of a circular basis, as was first observed by Reaumur in 1708, and afterwards by Maclaurin in 1720. Call CK, a, DE, b, ZH, x, HM, y, ZM, s; and let ZI be perpendicular to CK; then FZ = $a-s$, CI = $\frac{a-s}{2}$, and, CIZ and ZHM being similar, CZ : CI : : ZM : ZH, or $\frac{b}{2} : \frac{a-s}{2} : : s : x$; hence $bx = as - ss$, $bx + ss = as$, $b^2x^2 + 2bxs^2 + s^4 = a^2s^2$, and by substituting for s^2, $x^4 + 2ba^3 - a^2x^2 + b^2x^2 + 2x^2y^2 + 2bxy^2 + y^4 - a^2y^2 = 0$.

Cor. 1. Join FN, and complete the parallelogram MPNL, then since EF = DZ = EN, FN is perpendicular to EK, and ML to NL, and, NL being always equal to FM or CK, L is always in a circle described on the centre N, LM a tangent to that circle, and ZM a perpendicular to that tangent drawn from the point Z.

Cor. 2. fig. 8. The unicuspidate epicycloid admits of a peculiar central equation, with respect to the point S. Call SM, s, and let ST = u be perpendicular to the tangent MT, then $u = \left.\frac{s^5}{2a}\right|^{\frac{1}{2}}$. For the triangles SIP and MTS being similar, and IP being half of SM, or s, SP = $\sqrt{\frac{as}{2}}$, SPq : SMq : : IPq : STq, or $\frac{as}{2} : s^2 : : \frac{ss}{4} : u^2$, and $2au^2 = s^3$.

Cor. 3. fig. 8. The unicuspidate epicycloid is one of the caustics of a circle. For making the angle CRY = MRC = $\frac{1}{2}$ SCP, the triangle CRY is isosceles, and CY is constant; so that all rays in the direction of the tangent MR will be reflected by the circle QR towards Y, and consequently SM will be the caustic of a radiant point at Y.

Prop. IX. Problem. Fig. 9. To find a geometrical equation for the tricuspidate hypocycloid.

Let PA and MF be perpendicular to CS. Join PMB, KM, RMG, and PD. Then the angle APB is equal to the difference of APC and MPR, or to that of their complements PRM, PCA: but PRM = $\frac{1}{2}$ PKM = $\frac{1}{2}$ PCA, therefore APB = $\frac{1}{2}$ PCA = ADP = APS, and the triangles APS and APB are similar and equal. Let SC = a, SF = x, FM = y, and SB = r. Then SA : SP : : SP : SD, and SP = $\sqrt{ar}$. Draw PE perpendicular to BP; then BE = SD = $2a$, BC = $a-r$, EC = $3a-r$, and by similar triangles, CP : CR : : EC : CG = $\frac{1}{3}$EC = $a - \frac{1}{3}r$; therefore GB = $\frac{2}{3}r$; but BE : BG : : BP : BM, or $2a : \frac{2}{3}r : : \sqrt{ar} : \frac{r}{3}\sqrt{ar}$ = BM; again, BP : BM : : BA : BF, or $\sqrt{ar} : \frac{r}{3a}\sqrt{ar} : : \frac{r}{2} : \frac{rr}{6a}$, and SF = x, $= r - \frac{rr}{6a}$, $6ax = 6ar - rr$, and $r = 3a \pm \sqrt{9aa - 6ax}$. But MF$q$ = BMq − BFq, or $y^2 = \frac{r^3}{9a} - \frac{r^4}{36aa}$, and $36a^2y^2 = 4ar^3 - r^4$. By adding to this the square of the former equation, and proceeding in the same manner to exterminate r, we obtain an equation of the value of x and y, which when the surds are brought to the same side, and the square of the whole is taken, is at last reduced to $x^4 - 2ax^3 + 2x^2y^2 - 12axy^2 + y^4 + 12a^2y^2 = 0$, a regular equation of the fourth order.

Scholium. The equation of the corresponding hypotrochoids may be investigated nearly in the same manner, by dividing PR and PM in a given ratio, but the process will be somewhat more tedious.

Prop. X. Problem. Fig. 10. To find a geometrical equation for the bicuspidate epicycloid.

Let CP = PR. Join RMS, PM, PD; draw CT perpendicular to RT, TE to CR, and EG, MB, RA, to SC. Then the angle DRP = $\frac{1}{2}$ MKP = SCP, and by equal triangles, RA = CT, and RD = CD, and by similar triangles RM : RP : : RE : RT, and RP : RD : : RT : RC: therefore RM : RD : : RE : RC, and ME is parallel to SC. and EG = BM. Put CP = a, BC = x, BM = y, CM = s, CT = u; then by prop. 7. $u^2 = \frac{4}{3}(s^2 - a^2)$; or $\frac{3}{4}u^2 = s^2 - a^2$; but RC : CT : : CT : CE : : CE : EG, or y, hence $y = \frac{u^3}{4aa}$, $u^6 = 16a^4y^2$, $\frac{27}{64}u^6 = \frac{27}{4}a^4y^2 = (ss - aa)^3 = (xx + yy - aa)^3$; whence by involution the equation of the sixth order may be had at length.

Corollary. Since CRM = SCR, a ray in the direction of the tangent MR will be reflected by a circle FR always parallel to SC: therefore SM is the caustic of the circle FR when the incident rays are parallel to CS.

Prop. XI. Problem. Fig. 11. To find a geometrical equation for the quadricuspidate hypocycloid.

Let CR = PR, then the angle PRM = $\frac{1}{2}$ PKM = 2PCS, RAC = ACR, RA = RC = RB = RP, AB = SC, and drawing the perpendiculars CT, TD, TE, and MF, RM = RT, AM = BT, AF = EC, FC = AE, and FM = BD. Let SC = a, FC = x, FM = y, CM = s, CT = u; then AB : AC : : AC : AT : : AT : AE, whence AT = $(axx)^{\frac{1}{3}}$, and in the same manner BT = $(ayy)^{\frac{1}{3}}$; and CT being a mean proportional between AT and TB, $u^2 = (a^2x^2y^2)^{\frac{1}{3}}$, and $u^6 = a^2x^2y^2$. But by prop. 7. $3u^2 = a^2 - s^2$, therefore $27a^2x^2y^2 = (a^2 - s^2)^3 = (a^2 - x^2 - y^2)^3$; whence the equation may be had at length by involution. The same result may be obtained by Dr. Waring's method of reduction, from $(axx)^{\frac{1}{3}} + (ayy)^{\frac{1}{3}} = a$.

Cor. Since the portion of the tangent AB intercepted between the perpendiculars AC, BC, is a constant quantity, this hypocycloid may in that sense be called an equitangential curve; and the rectangular corner of a passage must be rounded off into the form of this curve in order to admit a beam of a given length to be carried round it.

Prop. XII. Problem. To investigate those cases in which the general propositions either fail or require peculiar modifications.

Case 1. fig. 12. If the generating circle be considered as infinitely small, or the basis as infinitely large, so as to become a straight line, the epicycloid will become a common cycloid, and the ratio of CP to CK in prop. 3. cor. 2. becoming that of equality, the length of the arc SM will be four times the versed sine of half PM, and VM twice

the chord RM or VX, therefore the square of the arc VM is always as the absciss VZ. The evolute is an equal cycloid, and the circles in prop. 6. being as 1 to 4, the area of the cycloid is to that of its generating circle as 3 to 1. The properties of the cycloid as an isochronous and as a brachistochronous curve belong to mechanics, and it is demonstrated by writers on optics that its caustic is composed of two cycloids.

Case 2. fig. 13. If the generating circle be supposed to become infinite while the base remains finite, the epicycloid will become the involute of a circle; and the fluxion of the curve being always, by prop. 3. cor. 1. to that of PM as PM to CP, its length SM will be a third proportional to IPand PM. Call CP, a, and PM, x, then the fluxion of SM is $\frac{x\dot{x}}{a}$; but the rectangle contained by half PM and the fluxion of SM is the fluxion of the area PSM, or PSM$=\int\frac{xx\dot{x}}{2a}=\frac{x^3}{6a}$. The epitrochoid described by the point C of the generating plane will be the spiral of Archimedes, since CN is always equal to PM$=$PS$=$QV; and since the angular motion of CN and PM are also equal, the area CON$=$PSM$=\frac{x^3}{6a}$. Instead of the ellipsis of prop. 3. let PX be a parabola of which IP is the parameter, and continuing NM to X, the arc PX will be equal to CON. For making LQ$=$CP, it is well known that the fluxion of PX varies as XQ or as PN, which represents the fluxion of CON. For the curvature, PY in prop. 4. becomes $=$CP, and the radius is a third proportional to NZ and NP.

Case 3. Supposing now the generating circle to become again finite, but to have its concavity turned towards the basis, the same curve will be described as would be described by the rotation of a third circle on the same basis in a contrary direction, equal in diameter to the difference of those of the two first circles.

Case 4. If the circles be of the same size, with their concavities turned the same way, no curve can be described; but if the generating circle be still further lessened, a hypocycloid will be produced, if the same figure as that which would be described by a third circle equal in diameter to the difference of the two first. All the general propositions are equally applicable to hypocycloids with other epicycloids, as might easily have been understood from an inspection of the figures, if there had been room for a double series.

Case 5. fig. 14. If the diameter of the generating circle be half that of the basis, the hypocycloid will become a right line, and the hypotrochoid an ellipsis. For since the angle PKM$=$2 PCS, PCM, being half PKM, coincides with PCS, and M is always in CS. Let GNL be the describing circle of the hypotrochoid, and join GNO, then NL is parallel, and ON perpendicular to SC and ON$=$HL, which is always to GO as CL to CG; therefore AN is an ellipsis: and the centre C will evidently describe a circle. (*British Mag.*)

The evolute of a cycloid being another equal cycloid; hence, if a body be suspended by a thread between two cycloidal cheeks, it will describe an equal cycloid by the evolution of the thread: and the time of vibration will be equal, in whatever part of the curve it may begin to descend.

The time of any semivibration in a cycloid, is to the time of falling through one half of the length of the thread, as half the circumference of a circle is to its diameter.

The properties mentioned in the last two articles, have been applied to pendulums moving in cycloidal arches; but their demonstrations are on a supposition that the whole mass of the pendulum is concentrated in a point, which can never take place in any really vibrating body. When the pendulum is of any finite magnitude, there is no point given in position which determines its length; on the contrary, the centre of oscillation will not occupy the same place in the given body when describing different parts of the track it moves through; but will continually be moved in respect of the pendulum itself during its vibration. There are many other obstacles which concur in rendering the application of this curve to the vibration of pendulums designed for the measures of time the source of many errors: errors indeed far greater than those which the cycloid by its peculiar property, of equality with its evolute, is intended to obviate. It is now wholly disused in practice.

CYCLO'IDAL. *a.* (from *cycloid.*) Relating to the cycloid.

CYCLOMETRY. (from κυκλος, circle, and μετρω, I measure.) The art of measuring cycles, or circles.

CYCLOPÆDIA. (from κυκλος and παιδια, instruction.) The circle, or compass of arts and sciences; more ordinarily called encyclopædia.

CYCLOPES, a certain race of men of gigantic stature, supposed to be the sons of Cœlus and Terra. They had but one eye in the middle of the forehead; whence their name, κυκλος, *circulus*, ωψ, *oculus*. Mythologists differ as to their number. Hesiod mentions three, Arges, Brontes, and Steropes. Virgil adds a fourth, Pyracmon. In the age of Ulysses, Polyphemus was their king. (See POLYPHEMUS.) They inhabited the western parts of Sicily; and, because they were uncivilized in their manners, the poets speak of them as men-eaters. The tradition of their having only one eye, originated from their wearing small bucklers which had a small aperture in the middle, which corresponded exactly to the eye. From their vicinity to mount Ætna, they have been supposed to be the workmen of Vulcan, and to have fabricated the thunderbolts of Jupiter. The shield of Pluto, and the trident of Neptune, were the produce of their labour. The Cyclops were reckoned among the gods, and sacrifices were solemnly offered to them at Corinth. Apollo destroyed them all, because they had made the thunderbolts of Jupiter, with which his son Æsculapius had been killed.

CYCLOPTERUS. Sucker. In zoology, a genus of the class pisces, order branchiostega. Head obtuse; mouth on the fore-part; tongue short, thick; teeth small, sharp, numerous; gill-membrane four-rayed; the cover of one piece; body short, thick, without scales; ventral fins united into an oval concavity, forming

an instrument of adhesion. These fishes inhabit the sea; feed on worms, insects, and the fry of other fishes; have no lateral line; and are furnished beneath the ventral fins with an oval aperture of a fleshy, muscular substance, and edged with small threaded appendages, by means of which they have the power of adhering so firmly to rocks, as scarcely to be removed by a force less than what is sufficient to destroy them. Ten species, of which the following may serve as examples. See Nat. Hist. Plate XLVII.

1. C. lumpus. Lump-sucker. Body angulate by rows of sharp bony tubercles. Several varieties, differing chiefly in colour. Inhabits the northern seas; one or two varieties the Indian and American seas; about two feet long; exceedingly fertile. Body thick, broad, variable in colours, but generally black above, cinereous at the sides, beneath orange, and rough, with seven rows of hard, radiate tubercles, of which one row is on the back, and three on each side. A variety, coloured with silvery sea-green, blue back, and pale rosy sides, was taken on the coast of North Wales in 1797.

2. C. gelatinosus. Jelly-sucker. Body naked, subdiaphonous, gelatinous; pectoral fins very broad. Inhabits the eastern coast of Kamschatka, and the opposite shores of America; about a foot and a half long; body very slender, oblong, compressed; thicker towards the head, and gradually tapering to the tail, whitish with a rosy tinge; skin smooth, very soft; when just caught trembles like a piece of jelly, and is so rank as to be abhorred even by dogs.

3. C. liparis. Unctuous sucker. Body naked; dorsal, anal, and caudal fins united. Inhabits the northern seas as far as Kamschatka, and sometimes gets up into rivers; from five to eighteen inches long; body elongated, thick, compressed, soft, unctuous, mucous like a snail, nearly transparent, and soon melts away; above, brown with darker stripes; beneath, white; sides and head yellow; flesh mucous and oily.

CYDER, or CIDER, a sharp, cool, and vinous beverage, made by fermenting the juice of apples. Some connoisseurs in this liquor are of opinion, that the juice of the more delicate table-fruit is generally more cordial and pleasant than that of the wild or harsh kinds; though others assert the latter to be in many respects preferable.

The apples should remain on the tree till they are thoroughly ripe, when they ought to be gathered with the hand in dry weather, that they may be protected both from bruises and from moisture. They are then to be sorted, according to their various degrees of maturity, and laid in separate heaps, in order to sweat; in consequence of which they greatly improve. This practice, however, appears to be useful only for such fruit as is not perfectly ripe, though some recommend it as being proper for all apples. The duration of the time of sweating may be determined by the flavour of the fruit, as different kinds require various lengths of time; namely, from eight or ten days to six weeks. The harsher and more crude the apples are, the longer it is necessary that they should remain in a sweating state, and not only be well dried, but the rotten parts carefully pared, before they are exposed.

It is very mortifying, after the experience of so many centuries, that the art of preparing the ancient British liquors, cyder and perry, should still be so imperfectly understood, that throughout the principal cyder districts, the practice should rest on the most vague principles, and that the excellence of the liquor should depend rather on a lucky accident than on good management: yet such appears to be really the case, even amongst the most experienced cyder-makers of Herefordshire and Gloucestershire.

Mr. Marshall, that nice observer of rural affairs, in his late tour through those counties (expressly undertaken for the purpose of inquiry on this subject), informs us, that scarcely two of the professional makers are agreed as to the management of some of the most essential parts of the process; that palpable errors are committed, as to the time and manner of gathering the fruit, in laying it up, in neglecting to separate the unsound, and to grind properly the rinds, kernels, &c. that the method of conducting the vinous fermentation, the most critical part of the operation, and which stamps the future value of the liquor, is by no means ascertained; for while some promote the fermentation in a spacious open vat, others repress it, by inclosing the liquor in a hogshead, or strive to prevent it altogether; that no determinate point of temperature is regarded, and that the use of the thermometer is unknown or neglected; that they are as little consistent as to the time of racking off, and whether this ought to be done only once, or five or six times repeated; that for fining down the liquor many have recourse to that odious article bullock's blood, when the intention might be much better answered by whites of eggs or isinglass; and finally, that the capricious taste of particular customers is generally consulted, rather than the real excellence of the liquor; and consequently that a very imperfect liquor is often vended, which tends to reduce the price, to disgrace the vender, and to bring the use of cyder and perry into disrepute.

The art of making vinous liquors is a curious chemical process: and its success chiefly depends on a dextrous management of the vinous fermentation, besides a close attention to several minute circumstances, the theory of which is not, perhaps, yet fully understood by the ablest chemists.

The general method of preparing cyder and perry is very much the same. The mill is not essentially different from that of a common tanner's mill for grinding bark; it consists of a mill-stone from two feet and a half to four and a half in diameter, running on its edge on a circular stone trough, from nine to twelve inches in thickness, and from one to two tons in weight: the bottom of the trough in which this stone runs is somewhat wider than the thickness of the stone itself; the inner side of the groove rises perpendicularly, but the outer is bevelled in such a manner as to make the top of the trough six or eight inches wider than the bottom, by which means there is room for the stone to run freely, and likewise for putting in the fruit, and stirring it up while grinding. The bed of a middle-sized mill is about nine feet, some ten, and some twelve; the whole being composed of two, three, or four stones, cramped together, and finished after being cramped in this manner: the best stones are found in the forest of

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bean, generally a dark-reddish gritstone, not calcareous; for if it were of a calcareous quality, the acid juice of the fruits would act upon it and spoil the liquor; a clean-grained grindstone grit is the fittest for the purpose. The runner is moved by means of an axle passing through the centre, with a long arm reaching without the bed of the mill, for a horse to draw by; on the other side is a shorter arm, passing through the centre of the stone, as represented in the figure. An iron bolt, with a large head, passes through an eye in the lower part of the swivel, on which the stone turns into the end of the inner arm of the axis; and thus the double motion of it is obtained, and the stone kept perfectly upright. There ought also to be fixed on the inner arm of the axis, about a foot from the runner, a cogged wheel, working in a circle of cogs fixed upon the bed of the mill; the use of these is to prevent the runner from sliding, which it is apt to do when the mill is full; it likewise makes the work more easy for the horse: these wheels ought to be made with great exactness. Mr. Marshall observes, that it is an error to make the horse draw by traces. "That acting point of draught (says he), the horse's shoulders, ought, for various reasons, to be applied immediately at the end of the arm of the axis; not two or three yards before it, perhaps in a small mill near one-fourth of its circumference." The building in which the mill is inclosed ought to be of such a size that the horse may have a path of three feet wide betwixt the mill and the wall, so that a middling-sized mill, with its horse-path, takes up a space of fourteen or fifteen feet every way. The whole dimensions of the mill-house, according to our author, to render it any way convenient, are twenty-four feet by twenty; it ought to have a floor thrown over it at the height of seven feet, with a door in the middle of the front, and a window opposite, with the mill on one side and the press on the other side of the window: the latter must be as near the mill as convenience will allow, for the more easy conveying the ground fruit from the one to the other. The press, of which the principle will be understood from the figure, has its bed or bottom about five feet square: this ought to be made entirely either of wood or of stone, the practice of covering it with lead being now universally known to be pernicious. It has a channel cut a few inches within its outer edges, to catch the liquor as it is expressed, and convey it to a lip formed by a projection on that side of the bed opposite the mill; having under it a stone trough or wooden vessel, sunk within the ground, when the bed is fixed low, to receive it. The press is worked with levers of different lengths, first a short, and then a moderately long one, both worked by hand; and lastly, a bar, eight or nine feet long, worked by a capstan or windlass. The expence of fitting up a mill-house is not very great. Mr. Marshall computes it from twenty to twenty-five pounds, and on a small scale from ten to fifteen pounds, though much depends on the distance and carriage of the stone: when once fitted up it will last many years.

The making of the fruit-liquors under consideration, requires an attention to the following particulars:

I. The fruit. II. The grinding. III. Pressing. IV. Fermenting. V. Correcting. VI. Laying up. VII. Bottling. Each of these heads is subdivided into several others.

I. In the management of the fruit, the following particulars are to be considered:

1. The time of gathering; which varies according to the nature of the fruit. The early pears are fit for the mill in September; but few apples are ready for gathering before Michaelmas; though, from accidental circumstances, they are frequently manufactured before that time; for sale cyder and keeping drink, they are suffered to hang upon the trees till fully ripe; and the middle of October is generally looked upon to be a proper time for gathering the stire apples. The criterion of a degree of ripeness is, the fruit falling from the tree; and to force it away before that time, in Mr. Marshall's opinion, is robbing it of some of its most valuable properties; "the harvesting of fruit (says he) is widely different in this respect from the harvesting of grain, which has the entire plant to feed it after the separation from the soil; while fruit, after it is severed from the tree, is cut off from all possibility of a farther supply of nourishment; and although it may have reached its wonted size, some of its more essential particles are undoubtedly left behind in the tree." Sometimes, however, the fruits which are late in ripening are apt to hang on the tree until spoiled by frosts, though weak watery fruits seem to be most injured in this manner; and Mr. Marshall relates an instance of very fine liquor being made from golden pippins, after the fruit had been frozen as hard as ice.

2. The method of gathering. This, as generally practised, is directly contrary to the principles laid down by Mr. Marshall, viz. beating them down with long slender poles. An evident disadvantage of this method is, that the fruit is of unequal ripeness; for the apples on the same tree will differ many days, perhaps even weeks in their time of coming to perfection, whence some part of the richness and flavour of the fruit will be effectually and irremediably cut off. Nor is this the only evil to be dreaded; for as every thing depends on the fermentation it has to undergo, if this is interrupted, or rendered complex by a mixture of ripe and unripe fruits, and the liquor is not, in the first instance, sufficiently purged from its feculencies, it is difficult to clear it afterwards. The former defect the cyder-makers attempt to remedy, by a mixture of brown sugar and brandy, and the latter by bullock's blood and brimstone; but neither of these can be expected to answer the purpose very effectually. The best method of avoiding the inconveniences arising from an unequal ripening of the fruit is, to go over the trees twice, once with a hook when the fruit begins to fall spontaneously; the second time when the latter are sufficiently ripened, or when the winter is likely to set in, when the trees are to be cleared with the poles above-mentioned.

3. Maturing the gathered fruit. This is usually done by making it into heaps, as has been already mentioned: but Mr. Marshall entirely disapproves of the practice; because, when the whole are laid in a heap together, the ripe fruit will begin to rot before the other has arrived at that degree of artificial ripeness which it is capable of acquiring. "The due degree of maturation of fruit for liquor (he observes), is a subject about which men, even in this district, differ much in their ideas. The prevailing practice of gathering into heaps until the ripest begin to rot, is wasting the best of the fruit, and is by no means an accurate criterion.

Some shake the fruit, and judge by the rattling of the kernels; others cut through the middle, and judge by their blackness: but none of these appear to be a proper test. It is not the state of the kernels, but of the flesh; not of a few individuals, but of the greater part of the prime fruit; which renders the collective body fit or unfit to be sent to the mill: the most rational test of the ripeness of the fruit is, that of the flesh having acquired such a degree of mellowness, and its texture such a degree of tenderness, as to yield to moderate pressure; thus, when the knuckle or the end of the thumb can with moderate exertion be forced into the pulp of the fruit, it is deemed in a fit state for grinding.

4. Preparation for the mill. The proper management of the fruit is to keep the ripe and unripe fruit separate from each other; but this cannot be done without a considerable degree of labour; for as, by numberless accidents, the ripe and unripe fruit are frequently confounded together, there cannot be any effectual method of separating them except by hand; and Mr. Marshall is of opinion, that this is one of the grand secrets of cyder-making, peculiar to those who excel in the business; and he is surprised that it should not before this time have come into common practice.

5. Mixing fruit for liquor. Our author seems to doubt the propriety of this practice; and informs us, that the finer liquors are made from select fruits; and he hints, that it might be more proper to mix liquors after they are made, than to put together the crude fruits.

II. Grinding, and management of the fruit when ground.—For the greater convenience of putting fruit into the mill, every mill should have a fruit-chamber over it, with a trap-door to lower the fruit down into the mill. The best manner in which this can be accomplished is to have the valve over the bed of the mill, and furnished with a hose or tunnel, reaching down to the trough in which the stone moves; no straw is used in the lofts, but sometimes the fruit is turned. In Herefordshire it is generally believed, that grinding the rinds and seeds of the fruit as well as the fleshy part to a pulp, is necessary towards the perfection of the cyder, whence it is proper that every kind of pains should be taken to perform the grinding in the most perfect manner. Mr. Marshall complains, that the mills are so imperfectly finished by the workmen, that for the first years they cannot perform their work in a proper manner. Instead of being nicely fitted to one another with the square and chisel, they are hewn over with a rough tool, in such a careless manner, that horse-beans might lie in safety in their cavities. Some even imagine that to be an advantage, as if the fruit was more effectually and completely broken by rough than smooth stones. Some use fluted rollers of iron, but these will be corroded by the juice, and thus the liquor might be tinged. Smooth rollers will not lay hold of the fruit sufficiently to force it through.

Another improvement requisite in the cyder mills, is to prevent the matter in the trough from rising before the stone in the last stage of grinding, and a method of stirring it up in the trough more effectually than can be done at present. To remedy the former of these defects, it might perhaps be proper to grind the fruit first in the mill to a certain degree, and then put it between two smooth rollers to finish the operation in the most perfect manner. It is an error to grind too much at once, as this clogs up the mill, and prevents it from going easily. The usual quantity for a middle-sized mill is a bag, containing four corn bushels; but our author had an opportunity of seeing a mill in which only half a bag was put, and thus the work seemed to go on more easily and more quickly than when more was put in at once. The quantity put in at one time is to be taken out when ground. The usual quantity of fruit ground in a day is as much as will make three hogsheads of perry or two of cyder.

Management of the ground fruit. Mr. Marshall condemns in very strong terms the practice of pressing the pulp of the fruit as soon as the grinding is finished, because thus neither the rind nor seeds have time to communicate their virtues to the liquor, or to extract these virtues in the most proper manner; some allow the ground fruit to lie twenty-four hours or more after grinding, and even regrind it, in order to have, in the most perfect manner, the flavour and virtues of the seeds and rind.

III. Pressing the fruit, and management of the residuum. This is done by folding up the ground fruit in pieces of hair-cloth, and piling them up above one another, in a square frame or mould, and then pulling down the press upon them, which squeezes out the juice, and forms the matter into thin and almost dry cakes. The first runnings come off foul and muddy, but the last, especially in perry, will be as clear and fine as if filtred through paper. It is common to throw away the residuum as useless; sometimes it is made use of when dry as fuel; sometimes the pigs will eat it, especially when not thoroughly squeezed; and sometimes it is ground a second time with water, and pressed for an inferior kind of liquor used for the family. Mr. Marshall advises to continue the pressure as long as a drop can be drawn. "It is found (says he) that even by breaking the cakes of the refuse with the hands only, gives the press fresh power over it: for, though it has been pressed to the last drop, a gallon or more of additional liquor may be got by this means: regrinding them has a still greater effect; in this state of the materials, the mill gains a degree of power over the more rigid parts of the fruits, which in the first grinding it could not reach. If the face of the runner, and the bottom of the trough, were dressed with a broad chisel, and made true to each other, and a moderate quantity of residuum ground at once, scarcely a kernel would escape unbroken, or a drop of liquor remain undrawn."

But though the whole virtue of the fruit cannot be extracted without grinding it very fine, some inconveniences attend this practice, as a part of the pulp thus gets through the hair-cloth, and may perhaps be injurious to the subsequent fermentation. This, however, may be in a great measure remedied by straining the first runnings through a sieve: the whole should also be allowed to settle in a cask, and drawn off into a fresh vessel previous to the commencement of the fermentation. The reduced fruit ought to remain some time between the grinding and pressing, that the liquor may have an opportunity of forming an extract with the rind and kernels; but this must not be pushed too far, as in that case the colour of the cyder would be hurt; and the most judicious managers object to the pulp remaining longer than twelve hours without pressure; "thence (says our author) upon the

whole, the most eligible management in this stage of the process appears to be this: grind one press-full a day; press, and regrind the residuum in the evening; infuse the reduced matter all night among part of the first runnings, and in the morning re-press while the next press-full is grinding."

IV. Fermentation. The common practice is, to have the liquor tunned, that is, put into casks or hogsheads, immediately from the press, and to fill them quite full; but it is undoubtedly more proper to leave some space empty to be filled up afterwards. No accurate experiment has been made with regard to the temperature of the air proper to be kept up in the place where the fermentation goes on.

Frost is prejudicial; but when the process usually commences, that is, about the middle of October, the liquor is put into airy sheds, where the warmth is scarcely greater than in the open atmosphere; nay, it is frequently exposed to the open air without any covering farther than a piece of tile or flat stone over the bung-hole, propped up by a wooden pin on one side to cause the rain-water to run off. In a complete manufactory of fruit liquor, the fermenting room should be under the same roof with the mill-house, a continuation of the press-room, or at least opening into it with windows or doors on every side, to give a free admission of air into it, with sufficient defence against frost; fruit-lofts over it, and vaults underneath, for laying up the liquors after fermentation, with small holes in the crown of the arch to admit a hose or pipe for the purpose of conveying the liquors occasionally from the one to the other.

In making of fruit-liquors no ferment is used, as in making of beer; though, from Mr. Marshall's account of the matter, it seems far from being unnecessary. Owing to this omission, the time of the commencement of the fermentation is entirely uncertain; it takes place sometimes in one, two, or three days, sometimes not in a week or a month, after tunning; but it has been observed, that liquor which has been agitated in a carriage, though just taken from the press, will sometimes pass almost immediately into a state of fermentation. The continuance of the fermentation is no less uncertain than the commencement of it. Liquors, when much agitated, will go through it perhaps in one day; but when allowed to remain at rest, the fermentation commonly goes on two or three days, and sometimes five or six. The fermenting liquor, however, puts on a different appearance according to circumstances; when produced from fruits properly matured, it generally throws up a thick scum, resembling that of malt liquor, and of a thickness proportioned to the species and ripeness of the fruit; the riper the fruit, the more scum is thrown up. Perry gives but little scum, and cyder will also sometimes do the same: sometimes it is intentionally prevented from doing it.

After having remained some time in the fermenting-vessel, the liquor is racked or drawn off from the lees, and put into fresh casks. In this part of the operation also Mr. Marshall complains greatly of the little attention that is paid to the liquor. The ordinary time for racking perry is before it has done hissing, or sometimes when it begins to emit fixed air in plenty. The only intention of the operation is, to free the liquor from its fæculencies, by a cork placed at a little distance from the bottom, after which the remainder is to be filtred through a canvas or flannel bag; this filtred liquor differs from the rest in having a higher colour, having no longer any tendency to ferment, but, on the contrary, checking the fermentation of that which is racked off; and if it loses its brightness, it is no longer easily recovered. A fresh fermentation usually commences after racking, and if it becomes violent, a fresh racking is necessary in order to check it, in consequence of which the same liquor will be racked off five or six times: but if only a small degree of fermentation takes place, which is called fretting, it is allowed to remain in the same cask, though even here the degree of fermentation which requires racking is by no means determined. Mr. Marshall informs us, that the best manufacturers, however, repeat the rackings until the liquor will lie quiet, or nearly so; or if it be found impracticable to accomplish this by the ordinary method of fermentation, recourse must be had to fumigation with sulphur, which is called stumming the casks. For this fumigation, it is necessary to have matches made of thick linen-cloth, about ten inches long, and an inch broad, thickly coated with brimstone for about eight inches of their length. The cask is then properly seasoned, and every vent, except the bung-hole, tightly stopped; a match kindled is lowered down into the cask, and held by the end undipped until it is well lighted, and the bung driven in; thus suspending the lighted match within the cask. Having burnt as long as the contained air will supply the fire, the match dies, the bung is raised, the remnant of the match drawn out, and the cask suffered to remain before the liquor is put into it for two or three hours, more or less, according to the degree of power the sulphur ought to have. The liquor retains a smell of the sulphureous acid; but this goes off in a short time, and no bad effect is ever observed to follow.

In some places the liquor is left to ferment in open casks, in which it stands till the first fermentation is pretty well over; after which the froth or yeast collected upon the surface is taken off, it being supposed that it is this yeast mixing with the clear liquor which causes it to fret after racking. The fermentation having totally ceased, and the lees subsided, the liquor is racked off into a fresh cask, and the lees filtred, as above directed. Our author mentions a way of fermenting fruit-liquors in broad shallow vats, not less than five feet in diameter, and little more than two feet deep, each vat containing about two hogsheads. In these the liquor remains until it has done rising, or till the fermentation has nearly ceased; when it is racked off without skimming, the critical juncture being caught before the yeast falls, the whole sinking gradually together as the liquor is drawn off. In this practice also the liquor is seldom drawn off a second time.

Cyder is made of three different kinds, viz. rough, sweet, and of a middle richness. The first kind, being usually destined for common use, is made with very little ceremony; if it is but cyder (says Mr. Marshall), and has body enough to keep, no matter for the richness and flavour. The rougher it is the farther it will go; and the more acceptable custom has rendered it, not only to the workmen but to their masters. A palate accustomed to sweet cyder, would judge the rough cyder of the farm-houses to be a mixture of vinegar and water, with a little dissolved alum to give it roughness. The method of producing this austere liquor is, to grind the fruit in a crude under-ripe state, and subject the liquor to a full fermentation; for the sweet liquor, make choice of the sweeter fruits, mature them fully, and check the fermentation of the liquor. To produce liquors of a middle rich-

The quince. The tree which affords this fruit is the pyrus cydonia of Linnéus. Pyrus foliis integerrimis, floribus solitariis. Quince seeds are directed by the London college to be made into a mucilage, which is recommended in aphthous affections and excoriations of the mouth and fauces. See PYRUS.

CYGNET. *s.* (from *cycnus*, Lat.) A young swan.

CYGNUS, in astronomy, the swan, an old northern constellation, between Lyra and Cepheus. It contains 81 stars of the first six magnitudes, viz. 0.1.6.16.16.42.

CYGNUS. In ornithology. See ANAS and SWAN.

CYLINDER, in geometry, a solid having two equal and parallel circular ends, and every plane section parallel to either end a circle equal to each of them.

Suppose two parallel circles AB and CD (the figure will be readily conceived), and a right line carried continually round them, always parallel to itself; this line will describe the curve surface of a cylinder, ABDC, of which the two parallel circles AB and CD form the two ends. When the line, or sides is perpendicular to the ends, the cylinder is a right or perpendicular one; otherwise it is oblique.

Or the right cylinder may be conceived to be generated by the rotation of a rectangle about one of its sides. The axis of the cylinder is the line connecting the centres of its two parallel circular ends; and is equal to the altitude of the cylinder when this is a right one, but exceeds the altitude in the oblique cylinder, in the proportion of radius to the sine of the angle of its inclination to the base.

The convex surface of a cylinder is equal to the product of the axis multiplied by the circumference of its base.

The solidity of a cylinder is equal to the area of its base multiplied by its perpendicular altitude.

Cylinders of equal bases and altitudes are equal.

Cylinders are to each other, as the product of their bases and altitudes. And equal cylinders have their bases reciprocally as their altitudes.

A cylinder is to its inscribed sphere, or spheroid, as three to two: and to its inscribed cone as three to one.

The oblique plane sections of a cylinder are ellipses; but all the sections parallel to the ends are circles.

For the surfaces and solidities of the ungulas, or oblique slices of a cylinder, see Hutton's Mensuration, p. 218, 2d edit.

CYLI'NDRICAL. CYLI'NDRICK. *a.* (from *cylinder.*) Partaking of the nature of a cylinder; having the form of a cylinder (*Woodward*).

CYLINDROID, a solid resembling the figure of a cylinder; but differing from it as having ellipses for its ends or bases, instead of circles, in the cylinder.

In the cylindroid, the solidity and curve superficies are found the same way as those of the cylinder; viz. by multiplying the circumference of the base by the length or axis; and the area of the base by the altitude, for the solidity.

CYLI'STA, in botany, a genus of the class diadelphia, order decandria. Calyx four-cleft, larger than the corol; the uppermost division cloven at the tip, the lowermost very large; corol permanent; legume mostly two-seeded. Two species, with axillary racemes and yellow flowers.

CYMA, or CYMATIUM, in architecture, from κυματιον, a wave, a member or moulding of the corniche, the profile of which is waved. In the cyma-recta, the concave part is at top, the convex at bottom. (See Plate 25). In the cyma-reversa, the convex part is at top, the concave at bottom: being the former member reversed, and commonly called by workmen an ogee.

CYMBAL, or CYMBALUM, an instrument of antiquity similar to the tympanum or drum. The cymbal was round, and made of brass, like our kettle drums; but is generally thought to have been smaller. The Jews had their cymbals, or instruments which translators render by that name. Ovid gives cymbals the epithet genialia, because they were used at weddings.

The modern cymbal is a mean instrument, chiefly in use among vagrants, gypsies, &c. It consists of steel wire, in a triangular form, whereon are passed five rings, which are touched and shifted along the triangle with an iron rod held in the left hand, while it is supported in the right by a ring, to give it the freer motion. Durandus says, that the monks used the word cymbal for the cloister-bell, used to call them to the refectory.

CYMBA'NCHE, in botany, a genus of the class polygamia, order monoecia. Inflorescence half-spiked. Herm. two-glumed, one-flowered, parallel to the rachis; outer valve linear; inner valve boat-shaped. Fem. calyx one-glumed, ovate, opposite the rachis. One species only: a native of Bengal.

CYMBA'RIA, in botany, a genus of the class didynamia, order angiospermia. Calyx ten-toothed; capsule heart-shaped, two-celled. One species, a native of Dauria, with large lateral flowers.

CYMBIFORM, in botany, boat-shaped.

CYME, or CYMA. In botany. (κυμα, *fœtus.*) It signifies properly a sprout or tender shoot, particularly of the cabbage. Dr. Withering calls it a tuft. Linnéus explains it to be an aggregate flower composed of several florets sitting on a receptacle, producing all the primary peduncles from the same point, but having the partial peduncles or petioles scattered or irregular; all fastigiate, or forming a flat surface at top. As in opulus, cornus sanguinea, ophiorhiza. The cyme is either naked, or with bractes. See CORYMB.

Flowers disposed in a cyme are called cymose flowers.

CYMINUM. See CUMINUM.

CYMOSÆ, the sixty-third of Linnéus's natural orders in Philosophia Botanica.

CYMO'THOA, in entomology, a tribe of the genus oniscus, so denominated by Fabricius. See ONISCUS.

CYNÆUS, of Thessaly, the scholar of Demosthenes, flourished 275 years before Christ. Pyrrhus had so high an esteem for him, that he sent him to Rome to solicit a peace; and so vast was his memory, that the day after his arrival he saluted all the senators and knights by name. Pyrrhus and he wrote a Treatise on War, quoted by Tully, and published by Casaubon.

CYNA'NCHE. (*cynanche*, κυναγχη, from κυων, a dog, and αγχω, to suffocate or strangle. It is so called from dogs being said to be subject to it. It is a name, however, equally inelegant and irrelevant; being often a mere symptom of a disease, and at other times not peculiarly attended with a sense of suffocation or throttling.) Angina. Sore-throat: a genus of diseases in the class pyrexiæ, and order phlegmasiæ of Cullen. It is known by pain and redness of the throat, attended with a difficulty of swallowing and breathing. The species of this disease are: 1. cynanche trachialis, the croup, a disease that mostly attacks infants, who are suddenly seized with difficulty of breathing and a crouping noise: it is an inflammation of the mucous membrane of the trachea, that induces the secretion of a very tenacious coagulable lymph, which lines the trachea and bronchia, and impedes respiration. 2. Cynanche tonsillaris, when the pain and redness attack the mucous membrane of the fauces, but more especially of the tonsils. 3. Cynanche pharyngea, when the pharynx is chiefly affected. 4. Cynanche parotidea. The mumps; an inflammation of the parotid gland, rendering deglutition difficult. 5. Cynanche maligna. The ulcerated, malignant, putrid sore throat. This is characterized by the deglutition being less difficult than in the other species, by spots of a whitish or ash colour attacking the tonsils and mucous membrane of the fauces, sometimes spreading all over the throat, and at other times forming distinct ulcers. It is always attended with great prostration of strength and typhus fever, and is very contagious.

CYNANCHUM, in botany, a genus of the class pentandria, order digynia. Natural order of contortæ, apocineæ, Jussieu. Corol contorted; nectary cylindric, five-toothed. There are thirty-nine species. These shrubs are commonly twining; leaves opposite; flowers axillary or terminating, disposed in spikes, corymbs, or umbels. They are chiefly inhabitants of hot climates; as such they are tender, and will not thrive in this country, unless they are placed in a bark stove.

CYNA'NTHROPY. *s.* (κυων κυνος, and ανθρωπος.) A species of madness in which men have the qualities of dogs.

CY'NARA. Artichoke. A genus of the class syngenesia, order polygamia æqualis. Receptacle bristly; calyx dilated, imbricate; the scales fleshy at the base, emarginate with a small point; down sessile, feathery. Eight species; chiefly natives of Spain and the Barbary coast. Of these two only are much cultivated in our gardens.

1. C. scolymus. Common garden artichoke; with leaves prickly or unarmed, pinnate and undivided; scales of the calyx ovate.

2. C. cardunculus. Cardoon; with leaves spinous, all pinnatifid, calyx—scales ovate. By some botanists supposed to be a mere hybrid of another species. The only eatable part is the stalks of the leaves blanched.

Both these species are perennial plants. The first is a native of Italy and Sicily, and comprehends the globe artichoke, and the green or French artichoke. The green artichoke was once in great repute, but is now never planted in the English gardens. The globe artichoke is the best sort. The manner of propagating this useful plant, is from slips or suckers taken from the old plant in February and March; these, if planted in a good soil, will produce a good fruit the autumn following. The old artichoke stocks are to be dressed in the latter end of February, or beginning of March; this must be thus performed; with a spade remove all the earth from about the stock, down below the part from which the young shoots are produced. Then make choice of two of the clearest and straightest, and most promising plants, which are produced from the under part of the stock; let these be left for a crop; then with a thumb force off all the other buds and young shoots close to the head of the stock, from whence they are produced, and with the spade draw the earth about the two plants which are left, closing it fast with the hands to each of them, and separating them asunder as far as can be without breaking them; then crop off the tops of the leaves which hang down. When this is done, a crop of spinach may be sowed between the stocks, which will be gathered off before they come to ripen. In the beginning of May, when the artichokes begin to fruit, all the young plants produced since the dressing must be removed, and all the suckers taken off, leaving only the one principal fruit; and when the artichoke is fit to gather, the stock must be cut down close to the ground, that it may shoot out new sprouts before October, which is the season for earthing them, or, as the gardeners call it, landing the artichoke stocks. The earthing them is as follows: cut off all the sprouts close to the ground, then dig trenches between the rows, covering up the stocks with the earth in ridges: those artichokes which are planted in a moist rich soil will always produce the largest fruit, but the roots will not live through the winter in a very moist one.

The cardoon or chardon is propagated in the kitchen garden annually from seeds, which should be sown upon a bed of light earth in March. When the plants come up, they should be thinned, where they are too close, and if they are wanted, those which are drawn out may be transplanted into a bed at about three or four inches distance, where they may remain till they are transplanted out for good. These young plants should be kept clean from weeds; and in June they must be transplanted out on a moist rich spot of ground, at the distance of four feet. The ground should be well dug before they are planted, and the plants should be

well watered till they have taken root; after which the ground must be kept very clean from weeds; and as they advance in height, there should be some earth drawn about each plant. When they are fully grown, their leaves should be closely tied up with a hay-band, and the earth drawn up in hills about them almost to their tops, being careful to prevent its falling between the leaves. In about five or six weeks after the plants have been thus earthed, they will be blanched enough for use.

CYNEGETICKS. *s.* (κυνεγετικα.) The art of hunting (*Brown*).

CY'NICAL. CY'NICK. *a.* (κυνικος.) Having the qualities of a dog; currish; brutal; snarling; satirical (*Wilkins*).

CYNICS, a sect of ancient philosophers, who valued themselves on their contempt of every thing, especially riches and state, arts and sciences; all excepting morality.

The founder of this sect is said to have been Antisthenes, a disciple of Socrates; who, after his master's death, quitting the Pyreum, retired to Cynosarges, a kind of academy not far from the gates of Athens.

Hence, some will have it, came the name κυνικος, *cynicus*, viz. from *cynosarges*. But others, with more probability, derive it from κυων, *dog*, because of their severity and importunity in reprehending vice. Thus, Aristotle observes, οι δε κυνικοι, &c. the Cynics were so called from their free way of rebuking, &c. Hence, Diogenes the Cynic said of himself, I bite the evil; and Antisthenes himself was called απλως κυων, an ingenious and sincere dog: it being the distinguishing character of the Cynics to attack and bark at the ill, and to defend and fawn on the good.

Diogenes was the most famous of Antisthenes's disciples, in whose life the system of this philosophy appears in its greatest perfection. He led a most wretched life, a tub having served him for a lodging, which he rolled before him wherever he went. Yet he was nevertheless not the more humble on account of his ragged cloak, bag, and tub; for one day entering Plato's house, at a time when there was a splendid entertainment there for several persons of distinction, he jumped upon a very rich couch in all his dirt, saying, "I trample on the pride of Plato." "Yes (replied Plato), but with greater pride, Diogenes." He had the utmost contempt for all the human race; for he walked in the streets of Athens at noon-day with a lighted lanthorn in his hand, telling the people, "He was in search of a man." Amongst many excellent maxims of morality, he held some very pernicious opinions; for he used to say, that the uninterrupted good fortune of Harpalus, who generally passed for a thief and a robber, was a testimony against the gods. He regarded chastity and modesty as weaknesses; hence Laertius observes of him, that he did every thing openly, whether it belonged to Ceres or Venus; though he adds, that Diogenes only ran to an excess of impudence to put others out of conceit with it. But impudence was the characterestic of these philosophers; who argued, that what was right to be done, might be done at all times and in all places. The chief principle of this sect in common with the Stoics, was, that we should follow nature. But they differed from the Stoics in their explanation of that maxim; the Cynics being of opinion, that a man followed nature that gratified his natural motions and appetites; while the Stoics understood right reason to be signified by the word nature.

CYNIC-SPASM, a kind of convulsion, wherein the patient is supposed to imitate the howling of dogs.

CYNIPS. Gall-fly. In zoology, a genus of the class insecta, order hymenoptera. Mouth with a short one-toothed membranaceous jaw, the mandibles vaulted, hollow, cleft; the lip entire; feelers four, short, unequal, capitate; antennas moniliform; sting spiral, often concealed within the body. The numerous excrescences or galls found on the roots, branches, and leaves of various trees are produced by the puncture of these insects; the larva is without feet, soft, cylindrical, and inhabits within the gall, feeding on the juices of the tree; the pupa resembles the perfect insect, except in having only the rudiments of wings. Thirty-five species; a few found in India, the rest in Europe, and chiefly in the oak, the different parts of which, and especially the buds and leaves, are inhabited by ten distinct species of this genus. The most beautiful gall produced on this or any other tree is the work of the cynips quercus gemmæ, who piercing the terminal bud of the tree, deposits its egg in the interior, and hereby, with the hatching and progressive growth of the larva, converts it from a healthy bud into a fine dark green, slightly gilded gall, leafed like a rosebud beginning to blow, about an inch in diameter, and held to the branch by a pedicle. The process of the deposit of the egg and transformation of the larva is nearly similar to that pursued by the CURCULIO NUCUM, which see. Plate LXXII.

CYNOCRAMBE. (*cynocrambe*, κυνοκραμβη; from κυων, a dog, κραμβη, cabbage; a herb of the cabbage tribe, with which dogs are said to physic themselves.) Dog's mercury. Mercurialis perennis of Linnéus. A poisonous plant very common in our hedges. It produces vomiting and purging, and the person then goes to sleep, from which he does not often awake.

CYNOGLOSSUM. Hound's-tongue. A genus of the class pentandria, order monogynia. Corol funnel-form, the throat closed with arched valves; seeds depressed, fixed to the style by the inner margin only. Twenty-four species, scattered over the globe, of which two are common to the wastes of our own country.

1. C. officinale. A narcotic poison; formerly used medicinally in certain cases. The best antidote against this poison is said to be acids.

2. C. sylvaticum; with stamens longer

NATURAL HISTORY.

PL. LXXII.

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Drawn from Life by S. Edwards.

than the corol; leaves spatulate lanceolate, lucid, nearly naked, rough underneath.

CYNOM'ETRA, in botany, a genus of the class decandria, order monogynia. Calyx four-leaved; anthers bifid at top; legume fleshy, lunate, one-seeded. Two species, both tall Indian trees, with white flowers from branches without leaves.

CYNOMO'RIUM, in botany, a genus of the class monœcia, monandria. Male; calyx an imbricate ament; corolless. Fem.: calyx an imbricate ament; corolless; style; seed one, roundish. Three species: Barbary, Jamaica, Cayenne.

CYNOPHONTIS, a festival, observed at Argos, in the dog-days; on which many dogs were killed.

CYNOREXIA. (*cynorexia*, κυνορεξια; from κυωι, a dog, and ορεξις, appetite.) A voracious or canine appetite. See Bulimia.

CYNO'SBATOS. See Cynosbatus.

Cyno'sbatus. (*cynosbatus*, from κυων, a dog, and βαλος, a thorn: so called, because dogs are said to be attracted by its smell.) Cynosbatos. The dog rose, or wild brier, or hip tree. Rosa canina germinibus ovatis pedunculisque glabris, caule petiolisque aculeatis, of Linnéus. The fruit of this tree, called heps or hips, has a sourish taste, and obtains a place in the London pharmacopœias in the form of conserve. It is seldom employed but to give form to more active remedies, in pills, boluses, linctuses, &c. See Rosa.

CYNOSURA, in astronomy, a denomination given by the Greeks to Ursa Minor, or the Little Bear, by which sailors steer their course. The word is formed of κυνος-ȣρα, q. d. the dog's tail.

Cynosura, in mythology, a nymph of Ida in Crete. She nursed Jupiter, who changed her into a star that bears the same name. It is the same as the Ursa Minor.

CYNOSU'RUS. Dog's-tail grass, in botany, a genus of the class triandria, digynia. Calyx two-valved, many-flowered; proper receptacle unilateral, leafy. Nineteen species, scattered over the globe, of which two are common to our own country.

1. C. cristatus, with bractes pinnatifid, awnless; spike simple, linear; found in our meadows.

2. C. echinatus, with bractes pinnate, chaffy awned; spike compound, ovate. Wild in sandy grounds.

There two or three other species assigned by some botanists to this genus, but erroneously.

CYNTHIUS and Cynthia, in mythology, surnames of Apollo and Diana, derived from Cynthia, the name of a mountain in the middle of the island of Delos.

CYPARISSUS. See Cupressus.

CY'PERUS, in botany, a genus of the class triandria, order monogynia. Glumes chaffy, imbricate in two rows; corolless; seed one, naked. Seventy-six species, scattered over the globe: which may be arranged into those

A. With round culm.

B. Three-sided culm; simple spikelets.

C. Three-sided culm; umbel glomerate, sessile.

D. Three-sided culm; spikes in terminal umbels.

E. Three-sided culm; umbels axillary.

The following are the three chief species.

1. C. rotundus, a native of India, with culm three sided, nearly naked, umbel decompound; spikes alternate linear. It grows by the side of canals and ditches; the leaves are green, and resemble those of the leek or onion. The odour is fragrant. This plant is sometimes used in medicine as an aromatic bitter and stomachic.

2. C. longus. English galangal: with culm three-sided, leafy; umbel leafy, more than decompound; peduncles naked; spikes alternate. This is the common cyperus of the dispensatories, but a less pleasant aromatic than c. rotundus. The roots of both plants are used, on account of their fragrance, by perfumers and glovers.

3. C. papyrus. Culm three-sided, naked; umbel longer than the involucres; involucels three-leaved, setaceous; spikelets in threes. It grows in the lakes of Ethiopia and Egypt, and is celebrated in almost all ancient history, as having furnished from its leaves the paper of early times. At what period it was first applied to this purpose we know not; but the books of Numa, at least, were written on papyrus leaves. The pellicle between the pith and the bark was also made use of for the same purpose. It was also employed in the manufacture of cordage; while the whole plant served for the form of boats, and the lower part of it for moulds, dishes, and cups.

CYPHER. See Cipher.

CY'PHIA, in botany, a genus of the class pentandria, order monogynia. Calyx five-cleft; petals five, linear, superior; filaments hairy; cohering; anthers not united; stigma drooping, gibbous. Six species, all Cape-plants.

CYPHON, in antiquity, a punishment by means of a wooden collar, which bowed the criminal's head forward.

CYPRŒA. Coury or gowrie, in zoology, a genus of the class vermes, order testacea. Animal, a slug or limax; shell univalve, involute subovate, smooth, obtuse at each end, linear, extending the whole length of the shell, and toothed each side. A hundred and nineteen species, chiefly found in the Atlantic and Indian seas. Of these, some are possessed of spires; some obtuse and spireless; some umbilicate and perforated; and some margined. We can only briefly notice the following.

1. C. testudinaria. Shell obtuse, sub-cylindrical; the extremities depressed. The largest shell afforded by the genus; whitish with russet brown clouds, and large blackish spots scattered here and there with sometimes a few white ones. Inhabits the Persian Gulph and Indian Ocean.

2. C. moneta. Shell whitish with a knotty margin. Inhabits the Mediterranean, Atlantic, Ethiopic and Indian seas; is fished up by

the negro-women three days before or after full-moon, and transported into Bengal, Siam, America, and the adjacent islands: and is the species used by the native blacks in their commercial concerns instead of money.

3. C. pediculus. Nun. Shell with transverse numerous furrows, some of them forked. Shell very small ovate, with various tints of red and white, with or without spots, and sometimes, but not always, marked with a longitudinal groove. There is another variety, of a much larger size. Both are found on most sea-coasts.

CYPRESS, in botany. See CUPRESSUS.

CYPRESS (Summer). See CHENOPODIUM.

CYPRIANUS (Thascius-Cæcilius), a principal father of the Christian church, was born at Carthage in Africa, at the latter end of the second or beginning of the third century. We know nothing more of his parents than that they were heathens; and he himself continued such till the last twelve years of his life. He applied himself early to the study of oratory; and some of the ancients, particularly Lactantius, inform us, that he taught rhetoric in Carthage with the highest applause. Cyprian's conversion is fixed by Pearson to the year 246, at Carthage, where, as St. Jerome observes, he had often employed his rhetoric in the defence of paganism. He died a martyr in the persecution of Valerian and Gallienus, in 258. Cyprian wrote 81 letters, and several treatises. The best editions of his works are those of Pamelius in 1568; of Rigaltius in 1648; and of Oxford in 1682.

CY'PRINUS. Carp. Mouth small, without teeth; gill-membrane with three rays; body smooth, generally whitish; ventral fins often nine-rayed. The fishes of this tribe are chiefly inhabitants of fresh waters; afford a palatable and nourishing food; feed on worms, insects, smaller fishes, leguminous seeds and fat earth: some of them migrate, and most of them spawn about April or May. Head compressed; scales shining, horny, and generally white; front blackish, broad; back arched; aperture of the gills large: the cover three-leaved; nostrils double; mouth round; lips cartilaginous, and furnished with a thick skin; tongue very minute, cartilaginous; jaws toothed beneath the gills; bones of the throat rough; intestinal canal continued from the teeth to the vent; liver two-lobed: air-bladder white, shining, round, two-parted; ovary and seminal vessel double; the males, and when in full roe the females, with hard, white, sharp tubercles on the scales. Fifty-one species, scattered through the waters of the globe: thus sub-divided into sections. See Nat. Hist. Plate XXIV. and XLVI.

A. Bearded; comprising nine species.

B. Tail nearly even at the end, comprising four species.

C. Tail three-parted; two species.

D. Tail bifid; thirty-six species.

The following are chiefly worthy of notice:

1. C. barbus. Barbel or barbot. Inhabits rapid stony rivers of Europe and Persia, and lies in holes near the banks; lives in societies, and feeds on testaceous animals, worms, smaller fishes, and carcasses; is so tame as to be often taken with the hand; grows fast, and is very long-lived; from two to fifteen feet long; body above olive; the sides above the line, bluish; beneath it, pale greenish; belly white; scales pale gold colour, edged with black and striate; flesh coarse, and the roe a little poisonous.

2. C. carpio. Common carp. Anal fin nine-rayed; cirri four; second ray of the dorsal fin serrate behind. Two other varieties; one with half the body covered with very large scales, and the other half naked; the other altogether scaleless. Inhabits the slow and stagnant waters of Europe and Persia, and was introduced into England in the year 1514: about four feet long, grows fast, and is very long-lived; feeds on herbs, fat earth, worms and aquatic insects, and any soft substance; is extremely fertile, and the prey of larger fishes, aquatic birds and frogs. Body above, blue-green; the upper part of the sides greenish, yellow, and blackish, beneath whitish; tail yellow; of the gall is made a green paint, and of the sounds or air bladder, a fish-glue or isinglass. From the spawn of the fish caviare is made for the Jews, since they hold the sturgeon, from which it is commonly prepared, in abhorrence. It is said to have attained, in some instances, the enormous weight of two hundred pounds: and by gradual exposure to air, instead of water, to be able to live, with only occasional submersions in water, in air alone, for weeks or months, or perhaps years.

3. C. gobio. Gudgeon. Anal fin eleven rayed; cirri two. Inhabits gentle streams and lakes of northern Europe; is tenacious of life, and very fertile; about eight inches long; feeds on herbs, worms, insects, the fry of other fishes, and parts of carcasses: varies its colours by age, the different waters it inhabits, and the different foods it eats; flesh white, and very grateful.

4. C. tinca. Tench. Anal fin twenty-five rays; tail entire; body mucous; cirri two. Another variety with golden body and transparent fins. Inhabits almost every where in stagnant waters; grows quickly, and reaches from four to eight pounds weight; is very fertile and tenacious of life, and will live all the winter under the ice; feeds on worms and water plants; is very stupid, and may be easily caught: flesh white, soft, and well tasted.

5. C. carassius. Crucian. Inhabits Europe and Siberia, chiefly in deep, stagnant waters; and is found in the Caspian sea; seldom exceeds a pound weight; flesh good.

6. C. cephalus. Chub. Anal fin eleven rayed; body nearly cylindrical. Inhabits fresh waters of Europe; about five pounds weight; flesh coarse and bony.

7. C. auratus. Gold-fish. Anal fin double, placed like the ventral. This most beautiful fish is an inhabitant of the rivers of China and Japan, and is naturalized almost every where, on account of its elegance and vivacity;

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the colours vary greatly, but are chiefly of splendid gold: scales large.

8. C. baphthalmus. Telescope carp. Scarlet; all the fins white; eyes protuberant. Inhabits China, and is equal in size and beauty to the last.

9. C. phloxinus. Minnow. Anal fin with eight rays; tail with a dusky spot near the base; body pellucid. Inhabits small gravelly streams of Europe; keeps in shoals near the surface; hardly three inches long; a favourite food of pikes.

10. C. lenciscus. Dace. Anal fins ten, dorsal nine-rayed. Inhabits deep still waters of England, France, southern Germany, Italy, and Siberia: from six inches to one and a half feet long: flesh white and good.

There is another variety, with slenderer body, and straighter backed, called graining, found in the Mersey near Warrington; seven and a half inches long.

11. C. rutilus. Roach. Anal fin twelve-rayed; reddish. Inhabits deep still waters; keeps in shoals; seldom weighs more than one and a half pound: flesh white and good.

12. C. orpus. Rud. Finscale. Anal fin thirteen-rayed; gill cover spotted with red. England, Russia, and Germany.

13. C. erythophthalmus. Red-eye. Anal fin fifteen-rayed; fins red. Inhabits the fresh waters of northern Europe, and the Caspian sea; about twelve inches long; flesh good in summer.

14. C. alburnus. Bleak. Anal fin with twenty rays. Inhabits in shoals fresh waters of Europe and the Caspian sea: from four to ten inches long: flesh white and good.

There is a variety with lateral straight line, called white-bait, found in the Thames in vast shoals in the month of June, about two inches long.

15. C. brama. Bream. Anal fin twenty-seven rayed; fins brown. Inhabits the lakes and still rivers of Europe, and the Caspian sea; from two to two and a half feet long; found in shoals: flesh insipid.

CYPRIPEDIUM, in botany, (from Κυπρις, Venus, and ποδιον, a shoe.) Ladies' slipper. A genus of the gynandria diandria class and order. Natural order orchideæ. Nectary ventricose, inflated, hollow. There are seven species: viz. c. calceolus, c. parviflorum, c. spectabile, c. acaule, c. ventricosum, c. macranthos, and c. jaconicum. Of these different species, c. pavifiorum is one of the most elegant; and we have, hence, selected it for a drawing. (See BOTANY, Plate LVIII.) This species of ladies-slipper is an inhabitant of North America, from New England to North Carolina. It has a very near resemblance to c. calceolus, or common European ladies-slipper, and seems to have been confounded with it by Michaux. The Carolina ladies-slipper, however, is a taller plant, more pubescent, with its lateral or interior petals longer, narrower, and more curled; and the nectary, or slipper, of a plain yellow colour without veins.

CYPRUS, an island of the Levant sea, lying near the coast of Syria and Natolia. It is about 150 miles long, and 70 broad. The air is hot and dry, and not very healthy; the soil produces corn, oil, cotton, salt, wood, some silk and wine, of which the best grows at the foot of Mount Olympus. The traffic of this island is very considerable, as consuls from almost every European nation reside here. While Cyprus was in the hands of the Christians, it was well peopled, and had eight hundred or a thousand villages; but at present it is so thinly inhabited, that half the lands lie uncultivated. The inhabitants are Turks, Jews, Greeks, and Armenians, with a few Latin Christians. The Greeks are the most numerous. The chief town is Nicosia, which is the seat of the Turkish viceroy, and was formerly the residence of its kings. The principal mountain bears the name of Olympus, of which name there are several others in Turkey. Here are no springs or rivers, but such as are produced by the annual rains. This island has been under the dominion of the Egyptians, Phœnicians, Persians, Greeks, Romans, Saracens, Venetians, and Turks. Richard I. king of England, meeting with an inhospitable reception here, subdued the island, and transferred his right to Guy of Lusignan, titular king of Jerusalem, whose descendants transferred it to the state of Venice, from whom the Turks took it in the year 1570, and it has since that time continued in their possession.

CYPRUS-BIRD. See MOTACILLA.

CYPRUS-WOOD. See ROSE-WOOD.

CYRENAICA, an ancient kingdom of Africa, corresponding to the present kingdom and desart of Barca and Tripoli.

CYRILLA, in botany, a genus of the class didynamia, order angiospermia. Calyx superior, five-leaved; corol funnel form, declined; the border flat, five-parted, nearly equal: rudiment of a fifth filament; capsule half two-celled. One species only: a native of Jamaica, with axillary peduncles and scarlet flowers.

CYRTA'NTHUS, in botany, a genus of the class hexandria, order monogynia. Corol superior, tubular, clavate, six-cleft; with ovate, oblong segments; filaments inserted in the tube, connivent at top. Three species; all natives of the Cape; generally with narrow scarlet flowers.

CYRUS, the son of Cambyses the Persian, by Mandane the daughter of Astyages king of the Medes. The two chief historians who have written the life of Cyrus are Herodotus and Xenophon; but their accounts of him are different, inasmuch as the latter makes his father a king of Persia, and the former a meaner man. He engaged in several wars, and subdued all the nations which lie between Syria and the Red Sea. He died at the age of 70 years, after a reign of 30: but authors differ very much concerning the manner of his death. Herodotus, Justin, and Valerius Maximus relate, that he died in the war against the

Scythians; and that falling into an ambush which queen Tomyris had laid for him, she ordered his head to be cut off, and cast into a vessel full of blood, saying, "Thou hast always thirsted after human blood, now glut thyself with it." Diodorus the Sicilian says, that he was taken in an engagement and hanged. Ctesias assures us, that he died of a wound which he received in his thigh: but by Xenophon's account, he died peaceably in his bed, amidst his friends and servants; and certain it is, that in Alexander's time his monument was shown at Pasagarda in Persia. A part of Cyrus's arguments for the immortality of the soul, in his dying speech to his sons, preserved by Xenophon, is cited at p. 253, vol. i. of Baxter on the Soul. Yet, on the whole, and considering the extraordinary difference of opinion among historians relative to Cyrus, it must be concluded that we are but imperfectly acquainted with the history of this great prince, the founder of the Persian, and destroyer of the Chaldean empire.

CYSTIC DUCT, in anatomy. Ductus cysticus. The membranous canal that conveys the bile from the hepatic duct into the gall-bladder.

Cystic artery. Arteria cystica. A branch of the hepatic.

CYSTI'TIS. (*cystitis*, κυϛιτις; from κυϛις, the bladder.) Inflammation of the bladder. A genus of disease arranged by Cullen in the class pyrexiæ, and order phlegmasiæ. It is known by great pain in the region of the bladder, attended with fever, a hard pulse, a painful discharge of urine, and a frequent desire to make water.

CYSTOCE'LE. (*cystocele*, κυστοκηλη; from κυϛις, the bladder, and κηλη, a tumour.) An hernia formed by the protrusion of the urinary bladder.

CYSTO'TOMY. *s.* (κυϛις and τεμνω.) The act or practice of opening encysted tumours.

CYTHEREA, in mythology: a sirname of Venus.

Cytherea, in the entomological system of Fabricius, a tribe of the genus Bombilius, which see.

CYTHNUS, the ancient name of Thermia, one of the Cyclades.

CY'TINUS. Rape of cystus. In botany, a genus of the class gynandria, order hexandria. Stigma one; calyx four-cleft, superior; corolless; anthers from twelve to sixteen, sessile; berry eight-celled, many-seeded. One species only; a parasitic plant growing from the roots of the cistus, with leaves sessile, closely imbricate; flowers in terminal clusters, dirty yellow.

Cy'tinus. (*cytinus*, κυτινος; from κυω, to produce: so called from its fecundity.) The bud or flower of the pomegranate.

Cytinus hypocistis. The plant from whose fruit the succus hypocistidis is obtained. See Hypocistis.

CY'TISUS. Tree-trefoil. A genus of the class diadelphia, order decandria. Calyx two-lipped; the upper lip two-cleft, lower three-toothed; legume tapering to the base. Twenty-five species, scattered over the globe, several of them arboreous, and lofty. Those most worthy of notice, and chiefly cultivated in our pleasure gardens, are the following.

1. C. laburnum, or large deciduous cytisus. 2. C. sessifolius. 3. C. nigricans, or dun-coloured cytisus. 4. Cytisus with erect spikes of flowers proceeding from the sides of the branches, spear-shaped woolly leaves, and the foot-stalk of the middle one the longest. 5. Cytisus with single lateral foot-stalks to the flowers, hairy, trifid, obtuse, ventricose, oblong cups. 6. Cytisus with flowers collected in heads, and branches lying on the ground. 7. Cytisus with lateral bunches of flowers, angular bunches, and wedge-shaped small leaves. 8. Cytisus with single, spear-shaped, narrow leaves, and angular branches. 9. Cytisus with lateral flowers, hairy leaves, and an upright striated stalk. 10. Cytisus with sessile flowers, hairy leaves, and an herbaceous stalk. 11. Cytisus with pinnated leaves.

The first species is a native of Switzerland, and grows to be a very large tree. The second, third, fifth, sixth, eighth, ninth, and tenth species, are natives of the southern parts of Europe, and as they grow to be eight or ten feet high, and in May are beautifully loaded with long strings of yellow flowers, make a very agreeable appearance in a garden. These are all propagated by sowing their seeds, which they afford in great plenty, in March, on a bed of good, fresh, light earth, sifting over the seeds about half an inch of fine mould: in a month's time the plants will come up; they must be kept clear from weeds, and watered at times, if the season prove dry. They should remain in the seed-bed till the March following, when they should be removed into nursery beds at a foot distance, in rows three feet asunder: here they must be watered, and their roots mulched till they are thoroughly rooted, and then the ground kept clear from all weeds. They should continue here three years, and be then removed to the places where they are to remain, in October, or else in February. The fourth, seventh, and eleventh species, are natives of the Indies, and too tender to bear the open air of this country: they must therefore be placed in a warm stove, and may be raised from seeds sown on a hot-bed. They will grow three or four feet high the first year, provided they have a proper heat, and the second year they generally produce flowers and seeds. The plants must be placed in the bark bed of the stove, but should have a large share of free air admitted to them in warm weather; they must have, however, but little water in winter, and may, in other respects, be treated in the manner of other tender exotics.

CYZICENS, Cyzicena, among the ancient Greeks, magnificent banqueting houses, always looking towards the north, and usually opening upon gardens.

CYZICUM, the ancient Dindymis; it was formerly a large and strong place, and sustained a long siege against Mithridates. It was

first ruined by an earthquake, and is now but an ordinary town. It was famous for a stately temple dedicated to the goddess Cybele. Lat. 46. 59 N. Lon. 17. 20 E.

CZAR, a title of honour, assumed by the grand-dukes, or, as they are now styled, emperors of Russia. The natives pronounce it tzar, or zaar; and this, by corruption (it has been fancied), from Cæsar, " emperor," from some imagined relation to the Roman emperors. But this etymology does not seem correct. When the czar Peter formerly required of the European courts an acknowledgment of his imperial titles, and that the appellation of emperor should never be omitted, there was great difficulty made about it, especially at the court of Vienna; which occasioned him to produce the famous letter, written in the German tongue, from Maximilian I. emperor of Germany, to Vassili Ivanovitch, confirming a treaty of alliance offensive and defensive against Sigismond king of Poland. In this dispatch, which is dated August the 4th, 1514, and is ratified with the seal of the golden bull, Maximilian addresses Vassili by calling him Keyser and Herrscher aller Russen, "emperor and ruler of all the Russias." But independently of this document, there could be no doubt that the foreign courts, in their intercourse with that of Moscow, styled the sovereigns indiscriminately great duke, czar, and emperor. With respect to England in particular, it is certain, that in Chancellor's Account of Russia, so early as the middle of the 16th century, Ivan Vassilevitch II. is called lord and emperor of all Russia; and in the English dispatches, from the reign of Elizabeth to that of Anne, he is generally addressed under the same appellation.

CZARINA, the title of the empress of Russia.

CZASLAU, a town in a circle of the same name in Bohemia, in Germany. Here the Imperialists dug up the remains of Ziska the famous Hussite general, and scattered them in the air. Lat. 49. 50 N. Lon. 15. 33 E.

CZENSTOCHOWA, a town of Cracovia in Poland, famous for the convent of St. Paul, the hermit, to which pilgrims very much resort. Lat. 50. 48 N. Lon. 19. 15 E.

CZERNIC. See ZIRNITCH.

CZERNICOE, the capital of a duchy of the same name in Muscovy. Lat. 51. 29 N. Lon. 31. 53 E.

CZERSK, or CZERSKO, a town of Massovia, in Poland, 20 miles N. W. of Warsaw. Lat. 52. 26 N. Lon. 21. 31 E.

CZOUGRODT, the capital of a territory of the same name, in Upper Hungary. Lat. 46. 36 N. Lon. 20. 54 E.

END OF THE THIRD VOLUME.

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